

# Coasts and Coastal People Scenarios of Change and Responses



## LOICZ II Inaugural Open Science Meeting Egmond aan Zee, Netherlands 27-29 June 2005

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The LOICZ Inaugural Open Science Meeting 2005 ushered LOICZ's second decade as a global change program. Building on its strengths in examining material fluxes from catchments to coast, the LOICZ project will now embark on a broadly expanded research framework focusing on the interactions between humans, ecosystems and material fluxes as drivers of coastal change. Over the three days of the meeting, a community of some 270 coastal scientists and managers representing 52 countries engaged in an exciting dialogue about these interactions, their trajectories of change, including ways to approach sustainable coastal scenarios.

Two plenary addresses each day provided an overview of the challenges facing the global environmental community. Plenary addresses were followed by oral presentation sessions where a keynote talk and paper presentations provided insight of future research needs and work in progress in regard to the research themes covered by the LOICZ Science plan. The meeting also importantly included afternoon workshops to develop research proposals and action plans targeting knowledge products.

The meeting provided opportunity for researchers and practitioners to forge new linkages or renewed ties with colleagues to pursue LOICZ related activities.

Beyond the Open Science Meeting, we hope that participants will have been encouraged to become, or remain, active in the LOICZ network. The success of LOICZ as a platform for global change research greatly depends on the individual and collective strength of its community members to see the program through to fruition.

We are grateful to all our sponsors.

## Summary Programme and Schedule

The LOICZ Inaugural Open Science Meeting (IOSM) had 4 components:

1. *Plenary Presentations* with invited speakers will exemplify the broad domain of research themes that are encompassed within the LOICZ Science Plan and Implementation Strategy (SPIS) and address some of the science challenges that face the next 10 years of LOICZ activity.
2. *Contributed Sessions* will provide opportunity for some 140 speakers to present the principal outcomes of recent research findings. Morning sessions linked to the research themes identified in the LOICZ SPIS will be given context by an invited *keynote speaker* who will kick-off each session as well as act as a co-convenor. In the afternoon continuation sessions will present papers that cross the theme structure of the LOICZ SPIS.
3. *Workshops* provide an opportunity for groups to discuss specific areas of research and interest to LOICZ, and identify the gaps in knowledge, the future challenges and identify the contribution that future activity directions that should be taken up by LOICZ. Each workshop will prepare a short report of their deliberations to report back to the whole meeting in Plenary to close each day.
4. *Poster presentations* are an important feature in the LOICZ IOSM and complement the oral presentations. An ice breaker session on Monday 27 June in the *Foyer* will provide all participants opportunity to view the posters. The poster will be available to view throughout the meeting.

## Meeting Overview

The tables below provide an overview of each day of the meeting:

Monday 27 June	Tuesday 28 June	Wednesday 29 June
<i>Welcome and Opening Address: LOICZ – past present &amp; future</i>		
<i>Plenary 1: Human Dimensions and Global Environmental Change</i>	<i>Plenary 2: Managing Canada's oceans and coasts: A framework and an emerging plan</i>	<i>Plenary 4: Making the connection between healthy waterways and healthy catchments</i>
<i>Plenary 2: Coastal ecology in a changing world: can we provide the answers we promised?</i>	<i>Plenary 3: Interaction between eutrophication and suspended matter dynamics of a shallow coastal sea</i>	<i>Plenary 6: Ecosystem-based knowledge for coastal governance</i>
<b>Morning coffee/tea</b>		
<b>Parallel Sessions</b>		
<i>Session 1: Climate change and the coastal zone</i>	<i>Session 7: Geohazards, ground water and risk</i>	<i>Session 13: Coastal Assessments</i>
<i>Session 2: Land-Ocean interactions on vulnerable coastal ecosystems (lagoons)</i>	<i>Session 8: Ecosystems, land and sea use (Deltas)</i>	<i>Session 14: Urbanisation</i>
<i>Session 3: Sediment flux to the coastal zone: climate change, anthropogenic influences and future trends</i>	<i>Session 9: Coastal waters ecohydrology: from the mountains to the coast</i>	<i>Session 15: Nutrient flux to the coastal zone: trends and implications</i>
<i>Session 4: Biogeochemical budgets</i>	<i>Session 10: Application of Remote sensing for Coastal Area management</i>	<i>Session 16: Shelf processes and the Earth System (Joint session with IMBER/SOLAS)</i>
<i>Session 5: Human coastal communities</i>	<i>Session 11: Integrated assessment of coastal change and management: Socio-economic modelling and future scenarios</i>	<i>Session 17: Coastal ecosystem governance</i>
<i>Session 6: Science, society and management of coastal zones</i>	<i>Session 12: Highlights of Dutch Coastal Zone Research</i>	<i>Session 18: Coastal typologies and datasets</i>
<b>Lunch</b>		
<b>Workshops &amp; Continuation Sessions</b>		
<i>Session 19: Climate change and ecological resources</i>	<i>Session 20: Nutrients, sediments and budgets</i>	<i>Session 21: Managing the coastal zone</i>
<i>Workshop 1: Risk and vulnerability of Coastal Systems due to Climate Change</i>	<i>Workshop 5: Issues in scale of bridging the natural and social sciences</i>	<i>Workshop 9: Coastal Assessments</i>
<i>Workshop 2: Integrated Coastal Zone Management and LOICZ – Current status</i>	<i>Workshop 6: Conceptual synthesis of global coastal environments</i>	<i>Workshop 10: Gauging Progress In Coastal Governance</i>
<i>Workshop 3: Coastal Biogeochemical and Ecological models</i>	<i>Workshop 7: Integrating Socio-economic variables in mapping and modelling material deliveries from catchment to coast</i>	<i>Workshop 11: From river to coast: Collaboration between GWSP and LOICZ</i>
<i>Workshop 4: Raising awareness and ownership of coastal management initiatives</i>	<i>Workshop 8: Marine Protected Areas – a management tool for ICZM?</i>	<i>Workshop 12: Implementation, Integration, and Participation: Strategies for LOICZ II</i>
<b>POSTER SESSION &amp; ICEBREAKER</b>	<b>MEETING DINNER</b>	

## Daily meeting schedule

The tables below provide the detailed schedule for each day. Descriptions of each Session and Workshop can be found starting on Page 16.

### Monday 27 June

Day 1. Plenary presentations	
Name	Abstract title
Young, B (Australia) & Göbel, B (Germany)	Human dimensions and global environmental change.
Herman, P (Netherlands)	Coastal ecology in a changing world: can we provide the answers we promised?

Day 1, Session 1: Climate change and the coastal zone. Convenor: Felino Lansigan                      Co-convenor: Richard Klein	
Name	Abstract title
Klein, R (Germany)	Keynote: A New Assessment of Coastal Vulnerability to Climate Change
Boot, G (Netherlands)	Coastal erosion and sea level rise at the global scale; An assessment of impacts and adaptation
Dingerson, L (USA)	Predicting future shoreline condition based on land-use change and increased risk associated with climate change
Thomalla, F (Sweden)	Understanding human vulnerability to coastal hazards and adapting to uncertain futures
Rupp-Armstrong, S (UK)	The future of managed realignment in Northern Europe – a comparative study of southern North sea coastal areas

Day 1, Session 2: Land-ocean interactions on vulnerable coastal ecosystems (lagoons). Convenor: Alice Newton                      Co-convenor: Nick Murray	
Name	Abstract title
Murray, N (Italy)	Keynote: A European point of view. The Water Framework Directive: Integrating Coastal Systems and River Basins.
Mariscal-Romero, J (Mexico)	Environmental problematic in Bahia de Navida lagoons: Reflections to implementation of a CZIM plan
Razinkovas, A (Italy)	Estuarine continuum in a temperate lagoon: spatial and temporal patterns
Hung, JJ (Taiwan)	Biogeochemical Responses to the Removal of Marine Aquaculture Structures from the Eutrophic Lagoon (Tapong Bay) in Taiwan
Franco, A (Portugal)	A model for sustainable management of penaeid shrimp fishery - application to Maputo Bay, Mozambique

Day 1, Session 3: Sediment flux to the coastal zone: climate change, anthropogenic influences and future trends Convenor: Juan Restrepo                      Co-convenor: John Milliman	
Name	Abstract title
Milliman, J (USA)	Keynote: Temporal change in global precipitation and river discharge. Are we seeing long-term change or simply natural oscillations?
Mil-Homens, M (Portugal)	A sequential method approach for sediment quality assessment
Sharma, K (Nepal)	Impacts of Human activities on regionwise budget and oceanward flux of sediment in South Asia
Knoppers, B (Brazil)	The Sao Francisco river basin and coastal zone, East Brazil: Physical and ecological alterations induced by dam construction

Salomons, W (Netherlands)	Soil-Catchment-Coast Continuum: Legacy of the past
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Day 1, Session 4: Biogeochemical budgets	
Convenor: Dennis Swaney	
Co-convenor: Gianmarco Giordani	
Name	Abstract title
Giordani, G (Italy)	Keynote: LaguNet, the Italian lagoon observational network: Evaluation of fluxes and derived ecosystem functions in the transition zones along the Italian Coast
Solidoro, C (Italy)	Applicability of LOICZ derived indexes in complex ecosystem. A multibox analysis for the lagoon of Venice
Friedrich, J (Germany)	Towards nutrient budget scenarios for the north-western Black Sea shelf
Prego, R (Spain)	Land-ocean exchanges and budgeting in a river-estuary-ria-shelf system
Dürr, H (France)	Estimating natural silica fluxes to the coastal zone using a global segmentation
Morozova, O (Russia)	Nutrient budgets in the arctic coastal systems

Day 1, Session 5: Human coastal communities	
Convenor: Bernhard Glaeser	
Co-convenor: Patricia Gallagher	
Name	Abstract title
Gallagher, P (Canada)	Keynote: Why don't we learn?
Campos, M (Philippines)	Fish for the future: An assessment of fishery conservation policies in the Philippines
Sarwar, G (Sweden)	Coastal fisheries of Bangladesh: how to adapt with sea level rise
Woodrow, M (Canada)	Vulnerability and adaptation in coastal communities: a case study in adaptation on Change Islands, Newfoundland following closure of the cod fishery in 1992
Nguyen Thi, Tram (Vietnam)	Local communities within the Honmun Marine Protected Area must be relevant

Day 1, Session 6: Science, society and management of coastal zones: Educational aspects	
Convenor: Wilhelm Windhorst	
Co-convenor: Don Alcock	
Name	Abstract title
Alcock, D (Australia)	Keynote: Seven habits of successful science communication programs
Ogodo, O (Kenya)	Media and environmental protection
Ballinger, R (UK)	Developing capacity building for local planners
Rigg, C (USA)	Common sense and common ground in marine and terrestrial resource management
Krain, E (Germany)	SPICE, an Indonesian-German research initiative within the frame of land and ocean interactions

Day 1, Session 19: Climate change and ecological resources	
Convenor: Ticky Forbes	
Name	Abstract title
Labane, L (Tunisia)	First assessment of the Tunesian coastline vulnerability to sea level rise
Khattabi, A (Morocco)	Fishing and aquaculture in the socioeconomic context of a coastal Mediterranean lagoon
Rahman, A (Bangladesh)	Challenges to sustainable development of Bangladesh Coastal Zone: An interplay of local, national, regional and global anthropogenic interventions
Del Toro, J (Mexico)	A regional approach for coastal sustainability, ICZM in the western central region of Mexico: building the coastal agenda
McFadden, L (UK)	A new model of wetland loss and sea-level rise

Shumilin, E (Mexico)	Evaluation of anthropogenic impact on coastal marine sediments of heavy metals transported by water streams affected by mining in North-Western Mexico: Semi-desertic Santa Rosalia, Baja California Sur and Tropical Marabasco River-the Barra de Navidad Lagoon, Colima
Krishnamoorthy, R (India)	Anthropogenic influences on freshwater resources versus Land Use and Cover Change (LUCC) in Southeast India coastal river basins-study based multi-data remote sensing data analysis and GIS application
Yamamuro, M (Japan)	Changes in the use of ecosystem due to the loss of eelgrass bed in estuarine lagoon, Lake Nakaumi, Japan
Guenette, S (Canada)	Insights from ecosystem modelling: the decline of Stellar sea lion in the Gulf of Alaska

Day 1, Workshop 1: Risk and vulnerability of Coastal Systems due to Climate Change

Convenor: Felino Lansigan

Co-convenor: Frank Thomalla

Keynote: Hinkel, J (Germany) - Methodological issues in coastal vulnerability assessment

Day 1, Workshop 2: Integrated Coastal Zone Management and LOICZ – Current status

Convenor: Peter Burbridge

Co-convenor: Ben Malayang III

Keynote: Harvey, N (Australia) - Global Change Implications for Asia-Pacific Coastal Management

Day 1, Workshop 3: Coastal Biogeochemical and Ecological models

Convenor: John Parslow

Co-convenor: Jack Middelburg

Day 1, Workshop 4: Raising awareness and ownership of coastal management initiatives

Convenor, Jeremy Hills

Co-convenor: Don Alcock

Keynote: Radford, T (UK) - TBA

## Tuesday 28 June

Day 2. Plenary presentations

Name	Abstract title
Harrison, P (Canada)	Managing Canada's oceans and coasts: <i>A framework and an emerging plan</i>
van Beusekom, J (Germany)	Interaction between eutrophication and suspended matter dynamics of a shallow coastal sea

Day 2, Session 7: Geohazards, ground water and risk.

Convenor: Nalin Wikramanayake

Co-convenor: Evgeny Kontar

Name	Abstract title
Kontar, E (Russia)	Keynote: The Southeast Asia Tsunami Disaster Aftermath: Development of New Approaches to Coastal Zone Hazard Observation and Warning Systems
Rapaglia, J (USA)	Measurements of submarine groundwater discharge and associated contaminants into the Venice lagoon, Italy
Demetriades, N (South Africa)	The Mkomazi estuary: Human effects, freshwater and an oligotrophic coast in south-east Africa
Gomez-Gesteira, M (Spain)	Human induced bloom generated by Mino River intrusion in a Galician Ria Baixa (NW Iberian Peninsula)
Narayanan, K (India)	Climate change and vulnerability: evidence from Indian coastal waters
McLean, R (Australia)	Vulnerability of coastal systems: comparative analyses of three atoll island states: Tuvalu, Kiribati and the Maldives

Day 2, Session 8: Ecosystems, land and sea use (Deltas).	
Convenor: Yoshiki Saito Co-convenor: James Syvitski	
Name	Abstract title
Syvitski, J (USA)	Keynote: The Impact of Humans on the Flux of Terrestrial Sediment to the Coastal Ocean on a Global basis: Long-term Averages and Seasonal Variability
Anagnostou, C (Greece)	Management of deltaic systems-The need to trace new ways of thinking Case study: Deltaic systems of the Hellenic peninsula
Rabouille, C (France)	The fate of the Rhone river delivery to the coastal ocean: the need of benthic observatories within RiOMar
Radakovitch, O (France)	Heavy metal inputs from rivers and their deposits at the scale of a continental shelf: the Gulf of Lions
Cheong, S (USA/Korea)	The river basin and coast as single system

Day 2, Session 9: Coastal waters ecohydrology: from the mountains to the coast	
Convenor: Laura David Co-convenor: Eric Wolanski	
Name	Abstract title
Wolanski, E (Australia)	Keynote: Estuarine and Coastal Zone Ecohydrology
Stevens, V (South Africa)	The threat and cascade method of estuarine health assessment- a logical sequence from impact to biological degradation via system physics and chemistry
Loeser, N (Germany)	River-basin - coast interactions: The Oder (Odra) case study
Schernewski, G (Germany)	Implementation of the European water framework directive in the Baltic region: a river-basin - coastal sea approach
Mwaipopo, R (Tanzania)	People, society and natural resource management: Understanding the implications of societal dynamics on the coastal environment
Monteiro, P, (South Africa)	Optimizing development needs at the River Basin-Coastal Ecosystem Scale: the Catchment2Coast Case Study in the Incomati-Maputo Bay System

Day 2, Session 10: Application of remote sensing for coastal area management	
Convenor: Goetz Floser/Weigen Huang Co-convenor: Paul DiGiacomo	
Name	Abstract title
DiGiacomo, P (USA)	Keynote: TBA
Vander Woude, A (USA)	Chlorophyll and sea surface temperature time scales for global oceans and nearshore retentive embayments off California
Ferrari, S (Italy)	Applications of remote sensing in the study of tidal environment ecogeomorphology
Salisbury, J (USA)	Contrasting inherent optical properties and inferred carbon metabolism between five north-eastern (USA) estuary-plume systems
Szlafsztein, C (Brazil)	Vulnerability assessment to coastal natural hazards in Amazon Region (Brazil) using GIS

Day 2, Session 11: Integrated assessment of coastal change and management: socio-economic modelling and future scenarios	
Convenor: Kerry Turner Co-convenor: Robert Nicholls	
Name	Abstract title
Nicholls, R (UK)	Keynote: An Integrated Assessment of Erosion and Flooding in North-East Norfolk, England
Prasad, M (India)	Status of quality of coastal environment in India - a review
Alder, J (Canada)	Value Trade-Offs of US Marine Habitats
Nunneri, C (Germany)	Managing on-site activities for achieving off-site environmental effects
Zessner, M (Austria)	Limits of cost-efficiency based nutrient management for river basins



Pongthanapanich, T (Denmark)	An optimal corrective tax for Thai Shrimp Farming
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Day 2, Session 12: Highlights of Dutch coastal zone research Convenor: Hans de Boois Co-convenor: Carlo Heip	
Name	Abstract title
Heip, C (Netherlands)	Keynote: History and Ecology of the Western Scheldt Estuary
Hoekstra, P (Netherlands)	Sediment transport, tidal flats, sand waves, shoreline bars
Sinninghe Damste, J (Netherlands)	Carbon, N, P etc. under human influence
Olsen, J (Netherlands)	Ecosystems, food chains and invasive species
Lindeboom, H (Netherlands)	Resources and risks: mining, fisheries, flood risks
Dieperink (Netherlands)	Governance and knowledge management

Day 2, Session 20: Nutrients, sediments and budgets Convenor: M Snoussi	
Name	Abstract title
Nitishinsky, M (Russia)	Carbon and nutrient fluxes in the arctic shelf
De Carlo (Honolulu)	Combined use of a coral reef instrumental platform (CRIMP) and synoptic water column sampling to characterize temporally and spatially the biogeochemical response of Kaneohe Bay, Hawaii to storm runoff input
Dedieu, K (France)	Coupling of carbon, oxygen and nitrogen cycles in sediments from a Mediterranean lagoon
Harcourt Baldwin, J-L (South Africa)	3D-numerical modelling of the hydrodynamics in a tidally energetic tropical embayment
Ruggieri, N (Italy)	Water and Nutrients Budget in a Semi-enclosed area of the coastal Ligurian Sea: the Port of Genoa
Kavalkli, Z (Greece)	An integrated coastal zone management approach based on scenario development and LOICZ budget analysis: application to a coastal ecosystem in the Aegean, Eastern Mediterranean
Bendell-Young, L (Canada)	Towards a sustainable shellfish industry; understanding the importance of upland sources of nitrogen to the geochemical cycling of nitrogen within the foreshore.
Radjawane, I.M (Indonesia)	On the study of simulated nutrient budget in Lampung Bay, Indonesia: Using coupled hydrodynamic-ecosystem model
Vinzon, S (Brazil)	Fine Sediment Retention in Estuaries in Amazon Estuary
Klaasen, W (Netherlands)	High CO <sub>2</sub> fluxes from the air into a tidal flat area

Day 2, Workshop 5: Issues in scale of bridging the natural and social sciences Convenor: Alison Gilbert Co-convenor: Jan Vermaatt	
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Day 2, Workshop 6: Conceptual synthesis of global coastal environments Convenor: Bill Dennison Co-convenor: Don Alcock	
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Day 2, Workshop 7: Integrating Socio-economic variables in mapping and modelling material deliveries from catchment to coast Convenor: Liana McManus Co-convenor: Deborah Balk Case study report: Krause, G (Germany) - Social-ecological system analysis for ICM support: A Mangrove Ecosystem in North Brazil	
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Day 2, Workshop 8: Marine Protected Areas – a management tool for ICZM? Convenor: Jackie Alder Co-convenor: Ron Johnstone
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Day 3. Plenary presentations	
Name	Abstract title
Bunn, S (Australia)	Making the connection between healthy waterways and healthy catchments
Olsen, S (USA)	Ecosystem-based knowledge for coastal governance

### Wednesday 29 June

Day 3, Session 13: Coastal assessments. Convenor: Laurence Mee Co-convenor: Veerle van der Weerd	
Name	Abstract title
Adriaanse, M (Netherlands)	Keynote: TBA
Kannen, A (Germany)	Changing human demands in marine areas: Implications for governance and use of integrated assessment concepts
Rullkoetter, J (Germany)	Interdisciplinary assessment of fundamental driving forces and transformation processes in a tidal basin, southern North Sea
Fernandez-Ramos, V (Uruguay)	GIS techniques for coastal habitats conservation in the Rio de la Plata
Taljaard, S (South Africa)	A proposed framework for managing (land-based) marine pollution sources in the BCLME region

Day 3, Session 14: Urbanisation. Convenor: Michel Meybeck Co-convenor: Frauke Kraas	
Name	Abstract title
Krass, F (Germany)	Keynote: TBA
Acma, B (Turkey)	Promoting sustainable human settlements and eco-city planning approach: Southeastern Anatolia Region and Southeastern Anatolia Project (GAP) in Turkey as a case study
Sharaf El Din, S (Egypt)	Impact of the extension of Alexandria coastal road on the transformation of material of the nearshore marine environment
Xu, X (China)	Land use conflicts and coordination in fast urbanized coastal zones
Perissinotto, R (South Africa)	Effects of sewage water disposal on the bio-physical dynamics of a South African temporarily open/closed estuary
Zanchettin, D (Italy)	New perspectives for the future of Venice

Day 3, Session 15: Nutrient flux to the coastal zone: trends and implications Convenor: Nancy Rabalais Co-convenor: Sybil Seitzinger	
Name	Abstract title
Seitzinger, S (USA)	Keynote: TBA
Liu, S (China)	The effects of Changjiang transport on nutrient dynamics in the Yellow and East China Seas in summer
Laane, R (Netherlands)	Anthropogenic influences of enhanced nitrogen and phosphorus concentrations in the Rhine Catchment and the Dutch Coastal zone
Lampert, C (Austria)	Integrated assessment of the nutrient management in the Danube Basin
Staneva, J (Germany)	Response of the Northwestern Black Sea shelf ecosystem to nutrient load and climate change
Jennings, M (South Africa)	Anthropogenic influence on estuarine derived nutrient dispersal in the nearshore off two permanently open South African estuaries with contrasting freshwater inflow

Day 3, Session 16: Shelf processes and the Earth System (joint session with IMBER & SOLAS) Convenor: Helmuth Thomas Co-convenor: Dileep Kumar/Jack Middleburg	
Name	Abstract title
Kumar, D (India) & Middleburg, J (Netherlands)	Keynote: Shelf processes: LOICZ-SOLAS-IMBER interactions
Liu, K (China)	The fates of terrigenous organic carbon and absorbed atmospheric CO <sub>2</sub> in the East China Sea
Boski, T (Portugal)	Varying sea levels – a possible clue for varying atmospheric CO <sub>2</sub> levels?
Ramesh, R (India)	Tsunami impact on water and trace gas flux in South India
Madron, X (France)	Natural and anthropogenic forcings on particulate matter budgets in coastal zone: Role of the re-suspension by storms and trawling
Da Cunha, C (Germany)	Regional impact of rivers on continental shelf biogeochemistry

Day 3, Session 17: Coastal ecosystem governance Convenor: Stephen Olsen Co-convenor: Alejandro Robles	
Name	Abstract title
Robles, A (USA)	Keynote: TBA
Belfiore S (Italy)	Measuring the Progress and Outcomes of Integrated Coastal Management Initiatives: Toward a Common Framework
Gault, J (Ireland)	From science to policy: Experiences of the COREPOINT project
Rafiqul-Islam, M (Bangladesh)	Institutionalization of ICZM at national level: Bangladesh experience
Osthorst, W (Germany)	ICZM as instrument of regional governance - between spatial planning and extended participation
Pickaver, A (Netherlands)	An indicator set to measure the progress in the implementation of integrated coastal zone management in Europe

Day 3, Session 18: Coastal typologies and datasets Convenor: Dennis Swaney Co-convenor: Bob Buddemeier	
Name	Abstract title
Buddemeier, B (USA)	Keynote: Typology: Tools for Integration and Analysis
Vafeidis, A (Greece)	Data requirements for global-scale coastal vulnerability analysis and the DINAS-COAST database
Colijn, F (Germany)	FerryBox - an observational system for the assessment of the coastal and shelf sea ecosystem
Jaganthan, R (India)	GIS based vulnerability mapping and coastal zone management: A case of part of Tamil Nadu coast, India
Hinkel, J (Germany)	The development of the DIVA tool for assessing coastal vulnerability
Maxwell, B (USA)	Web-based tools for typology development and data mining

Day 3, Session 21: Managing the coastal zone Convenor: Eva Roth	
Name	Abstract title
Vodden, K (Canada)	Watershed-coastal interactions: building and supporting institutions for positive change
Dinelli, E (Italy)	Sediment-biota interactions in a polluted coastal lagoon (Piallassa Baiona, northern Italy): integrated geochemical and biological investigations
Burkhard, B (Germany)	Use of a virtual centre of competence as a management, information and education tool in coastal zones

Gee, K (Germany)	National ICZM strategies in Germany: challenges to the spatial planning approach
Moya, B (Cuba)	Hicacos peninsula, a coastal territory, with urban and non-urban space face to future changes
Ostrovskaya, E (Russia)	Ecological zoning of the Northern Caspian
Fontalvo-Herazo (Germany)	Method for the design of a participative indicator system as a tool for integrated coastal local management, Braganca peninsula-North Brazil
Lengyel, P (Romania)	Electronic networking on Black Sea conservation issues in Romania
Lechuga-Deveze, C.H (Mexico)	Using LOICZ biogeochemical modelling to achieve federal environmental regulations for shrimp aquaculture on the Sinaloa coast of Mexico

Day 3: Workshop 9: Coastal Assessments Convenor: Laurence Mee                      Co-convenor: Martin Adriaanse	
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Day 3, Workshop 10: Gauging Progress In Coastal Governance Convenor: Stephen Olsen                      Co-convenor: Peter Burbridge	
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Day 3, Workshop 11: From river to coast: Collaboration between GWSP and LOICZ Convenor: Liana McManus & Joe Alcamo                      Con-convenor: Hartwig Kremer & Eric Craswell	
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Day 3, Workshop 12: Implementation, Integration, and Participation: Strategies for LOICZ II Convenor: Bob Buddemeier                      Co-convenor: Bruce Maxwell Keynote: Dürr, H (France) - Towards a classification of coastal ribbon lithology using a new global database	
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### Poster presentations

Poster author and titles	
Al-Rousan, S (Jordan)	Invasion of anthropogenic CO2 recorded in stable isotopes of planktonic foraminifera from the northern Gulf of Aqaba, Red Sea
Araki, R (Brazil)	Precipitation events associated with landslides in the tropics-Guaruja City, and example of Brazil
Aulinger, A.	Deposition of polycyclic aromatic hydrocarbons emitted from ship engines into the North Sea
Bock, S	Internet tools for coastal issues: A project database
Brewer, DT	Impacts of gold mine waste disposal on the sustainability of deep water fish in a pristine tropical oceanic system
Broqueira, M.J.	Environmental variables shaping phytoplankton structure in Tagus estuary
Buddemeier, R (USA)	Examples and achievements of typological applications
Cinnirella, S (Italy)	Water bodies characterization through GIS for complying the WQOs as established in the WFD
Craswell, E	The Global Water System Project
Darracq, A	Advective travel time variability in stream networks
De Souza (Brazil)	Biogeochemistry of N,P and Si fluxes to the East Brazil coastal zone. A tropical reservoir functioning or multiple impact scenario
Dennis, DM	How does gold mine waste disposal affect shallow coral reef fishes and habitats at Lihir Is, Papua New Guinea?
Ekau, W	IOI - OceanLearn; The Training and Education Programme of the International Ocean Institute
Fry, G	Impacts of gold mine waste disposal on the sustainability of deep slope fish communities in a pristine tropical oceanic system

Glaser, M.	"The Social" in ecosystem research: pitfalls and potentials
Gonzalez-Mirelis, G (Spain)	Land meets ocean: the compilation of a GIS database for linking nutrient loading data with catchment area information
Hilton, M.	The redistribution of Coastal Dune Plants-A Global Issue
Huthnance, J (UK)	Process contributions to shelf-ocean exchange
Jayawardena, U (Sri Lanka)	Effects of the Tsunami to the human society due to the negligent of the Coastal Zone of Sri Lanka
Jedrzejczak, M (Poland)	Bridging biodiversity and tourism towards sustainable development of sandy beaches
Jinadasa, S (Sri Lanka)	Geo-morphological influences to protect the hazard ness of tsunami waves at coastal belt of Yala, Sri Lanka
Llorenz, J.L.P.	The use of phytoplankton and macrophytobenthos as potential quality elements in coastal waters of Ageciras Bay and surrounding areas
Mensah, A (Ghana)	The influence of land use activities on nutrient and sediment loading into upland catchment streams of Ghana
Mhammdi, N (Morocco)	'Natural' and 'Anthropogenic' vulnerability of the coastal zones of Morocco- A preliminary integrated analysis
Milton, D	Heavy metal uptake by coral reef fish at Lihir Is, Papua New Guinea: relative importance of gold mine wastes and natural sources of heavy metals
Monteiro, P.	The biogeochemical linkage that governs the dependency of mangrove new production fluxes and food web responses to river boundary characteristics: Catchment2Coast Programme study in Maputo Bay, Mozambique
Newton, A (Portugal)	The LOICZ Erasmus Mundus joint master in water and coastal management
Nogueira, M (Portugal)	Estuarine processes involving organic carbon at different tide conditions
Nguyen Thi, K.A (Vietnam)	The situation of coastal fishery resources in Vietnam and some proposed solutions
Nunes, L (Brazil)	Environmental problems in the coast of Southeastern Brazil: determinants and impacts
Perillo, G (Argentina)	Shallow ponds as sediment and nutrient retainers, Buenos Aires Province, Argentina
Rabalais, N (USA)	Euthrophication adjacent to the Mississippi river plume
Rebelo, L.P.	Troia peninsula evolution: Foredunes as an accretion/erosion indicator
Rachold, V.	Arctic Coastal Processes
Shaghude, Y. (Tanzania)	The present and anticipated river basin and coastal impacts of water abstraction along the Rufiji river catchment, Tanzania
Spagnoli, F	Organic matter cycling in sediments of gulf of Manfredonia, Southern Adriatic Sea
Thomas, H (Canada)	Enhanced open ocean storage of CO2 from shelf sea pumping
Viaroli, P	Identification of monitoring criteria for transitional waters
Vorlauf, M	Internet tools for coastal issues: Awareness rising and education
Weragala, N.	Definition of a Tsunami safe boundary for Sri Lanka: A case study in the coastal zone of Galle, Matara and Hambantota districts

## **SESSION AND WORKSHOP DESCRIPTIONS**

### **Session 1. Climate Change and the Coastal Zone**

Convenor: **Felino Lansigan**

Co-Convenor: **Richard Klein**

Coastal zones are vulnerable to climate change and variability and related processes such as sea level rise, typhoons or cyclones, wind circulation, etc. Assessment of the impacts of climate change on the coastal systems may include the evaluation of both the biophysical and socio-economic processes which can be used to identify and formulate a suite of appropriate and cost-effective strategies to cope up with the associated risks. On the other hand, assessment of the vulnerability of the coastal system due to climate change may focus on how such driver of change or the causal mechanism affect the response and capacity of the ecological and social elements in the watershed-river-coast continuum. Such assessment studies may employ a variety or combination of approaches and methods such as (1) modelling and simulation at different scales, (2) scenario analysis, (3) development and use of vulnerability indicators which may be compared across regions and at different scales, (4) assessing vulnerability in the context of sustainability of coastal system, and (5) analysis of risks of socio-economic groups, etc. Regardless of differences in approaches and methods employed, however, assessments of impacts as well as vulnerability studies on climate change and coastal zones contribute to better understanding of the ecological and socio-economic elements. These body of integrated scientific information may be synthesized, and must feed into a platform or framework for science-based policy formulation and knowledge-based resources management strategies for sustainable coastal zone development.

### **Session 2. Land-Ocean interactions on vulnerable coastal ecosystems (lagoons)**

Convenor: **Alice Newton**

Co-Convenor: **Nick Murray**

Coastal environments occupy one of the most dynamic interfaces on Earth and support some of the most diverse and productive habitats. The existence of many coastal ecosystems is dependent on the land-sea connection or arises directly from it (e.g., lagoons, deltas and estuaries). Coastal environments, settlements, and infrastructure are exposed to land-sourced and marine hazards such as storms (including tropical cyclones), associated waves and storm surges, tsunamis, river flooding, shoreline erosion, and influx of biohazards such as algal blooms and pollutants. The changes occurring in the functioning of the global system have implications for human well being. Basic goods and services provided by coastal systems, such as sufficiency and quality of food and water as well as an environment conducive to human health are all vulnerable to change. All of these factors need to be recognized in assessing human induced changes to the coastal system and the concomitant hazards posed to communities and ecosystems.

The sheltered, coastal waters of lagoons are often regions of restricted exchange that form a transition between the land and the ocean. Lagoons are highly vulnerable and highly valuable coastal systems, both from the ecological and economical perspective. Very different conditions are found in lagoons from high latitudes, such as boreal lagoons to tropical lagoons, but these systems share their vulnerability to global change. The sheltered, productive waters of lagoons support important ecosystems and provide a wide range of ecosystem services such as tourism, fisheries and

aquaculture making them particularly attractive coastal zones for human settlement, development and urbanization.

Session 3. **Sediment flux to the coastal zone: climate change, anthropogenic influences and future trends**

Convenor: **Juan Restrepo** Co-Convenor: **John Milliman**

In estuaries and coastal zones, which serve as major sinks for sediments and are the major sites of nutrient-sediment biogeochemical processes, the alteration of the natural river sediment supply can cause considerable changes in the metabolism of the coastal zone and/or coastal zone morphology. Land use and climate change in river catchments during the past century have altered basin hydrology and sediment load, which in turn have produced ecological responses in the upstream and coastal areas of societal significance. The interplay between human induced activities and natural factors along the river catchment /coast continuum has to be understood in assessing the magnitude and variations of sediment flux to the global coastal zone, and the implications of these discharges and changes on human uses and coastal functioning and services.

Session 4. **Biogeochemical Budgets**

Convenor: **Dennis Swaney** Co-Convenor: **Gianmarco Giordani**

**Introduction:** Under LOICZ I, considerable progress has been made in compiling nutrient budgets (N, P and occasionally Si) of the world's estuaries, bays, and even seas. This work continues, following a well-established LOICZ methodology, and some results on global patterns which are derived from this work have been published. This session welcomes presentations of budgets of coastal ecosystems and related topics including presentations on:

- ◆ nutrient budgets which follow current LOICZ conventions
- ◆ budget constructed using alternative approaches (especially where comparisons to the LOICZ approach can be made)
- ◆ budgets of materials other than dissolved N and P (e.g. sediment, other nutrients, etc)
- ◆ techniques for assessing particular aspects of nutrient budgets (e.g. specific nutrient fluxes)
- ◆ techniques for addressing analytical issues of nutrient budget calculations (e.g. uncertainty analysis)
- ◆ governance and policy implications in relation to nutrient budgets
- ◆ regional or global syntheses of budget-based information, etc.

Session 5. **Human Coastal Communities**

Convenor: **Bernhard Glaeser** Co-Convenor: **Patricia Gallagher**

Human coastal communities compete for space and resources. This competition may result in conflicts. Conflicts are driven and shaped by economic interests, cultural values, perceptions of coastal images (how one might expect, believe or wish a coast ought to appear), and by visions of coastal futures.

Conflict resolution requires good governance, which implies, first and foremost, participation, transparency, legitimacy, accountability, and recognition of scales.

Governance across scales means national ICZM strategies, regional specifications, and local implementation as well as linking different coastal communities and human demands.

Mediation, round tables, and dialogues between different coastal communities and stakeholders are one approach to conflict resolution and an important step towards stimulating, implementing and guaranteeing sustainable coastal development. This paper session features different coastal communities acting at different scales, and their interactions, conflicts, values, and visions. The focus will include, *inter alia*, fishing, off-shore wind farming, mariculture communities, and island populations.

**Session 6: Science, society and management of coastal zones**

Convenor: **Wilhelm Windhorst** Co-Convenor: **Don Alcock**

**Introduction:** Are we ready to bridge the gaps between stakeholders? How do we increase local knowledge, community action and stakeholder participation for integrated coastal zone management? Success will depend on developing the skills and capacity of the people involved. The goal of this cross cutting session is to present innovative training and education concepts, methods and programs which will increase our ability to deal with pressing coastal issues. The session will cover formal education, stakeholder training and community education initiatives.

**Workshop 1. Vulnerability of Coastal Ecosystems and Communities to Climate Change**

Convenor: **Felino Lansigan** Co-Convenor: **Frank Thomalla**

In recent years an increasing amount of scientific research has contributed to improving our general understanding of global climate change and the potential impacts of such change on the world's coasts. However, there are still considerable gaps in our knowledge with respect to how multiple biogeophysical and anthropogenic processes interact to create risk, and how the vulnerability of coastal communities to climate change is shaped by these interlinked processes. In order to improve our understanding of such relationships, integrated assessments of human and ecosystem vulnerability need to be undertaken at different spatial (continental, regional and sub-regional) and temporal scales. Thus, following the session on *Climate Change and Vulnerability of the Coastal Zone*, a workshop will be convened to define the priority research agenda and workplan for the LOICZ II Theme 1 to address the issues of risk, vulnerability and adaptation to climate change in coupled human and ecological coastal systems. The workshop session will involve panel and open discussions on combining or integrating the analytical approaches of both the natural and social sciences in analyzing and assessing the effects and impacts of changes in the coastal zones on humans and ecosystems. The discussion will focus on the following issues: (1) the development and improvement of scientific methodologies for risk and vulnerability assessments, including indicators, scale of analyses, metrics of measurements; (2) the determination of thresholds and how to cope with uncertainties; (3) the identification of science gaps on risk and vulnerability of coastal systems and how to address them; (4) the identification of adaptive capacities and the development of coping strategies; and (5) how to strengthen scientific networks, research links and collaboration in the context of LOICZ SPIS.



## Workshop 2. **The Potential Contribution by LOICZ to Integrated Coastal Management**

Convenor: **Peter Burbridge**

Co-Convenor: **Ben Malayang III**

Integrated Coastal Management (ICM) represents the current phase in development planning where the interactions between land and sea are recognised as having a major influence on how coastal systems respond to human activities. ICM also recognises the influence of policies, investment strategies and development plans governing human activities have on the ability of coastal systems to sustain human development needs and aspirations.

The five new Research Themes are intended to promote better integration among scientific disciplines and our partnership with the International Human Dimensions programme will help to engage the social science more effectively with our strong natural science foundations. The theme on Sustainable Use of Coastal Regions and Natural Systems forms one mechanism for better integration of the results and findings of individual LOICZ initiatives. To be fully effective this and other themes must consider the community of ICM policy makers, planners, managers and people who live and work in coastal regions as essential users of the products of LOICZ science.

LOICZ science has great potential to have a positive influence on policies, strategies and more local management plans for coastal regions. For this to happen the LOICZ community must develop a culture that strives for greater integration of the results of past research, that develops more integrated science in the new research themes and most important- seeks to communicate the results of past and on-going research more effectively with potential users from the field of governance and management. This is a major challenge we must address at this Open Science Meeting.

## Workshop 3. **Coastal Biogeochemical and Ecological Models**

Convenor: **John Parslow**

Co-Convenor: **Jack Middelburg**

LOICZ 1 adopted a diagnostic approach to coastal biogeochemical modelling, developing a formal and consistent framework for quantifying and analyzing the fluxes and transformations of biogeochemical tracers in coastal systems. LOICZ II will also use prognostic coastal models to predict the responses of coastal biogeochemical (and ecological) systems to changing local and global pressures. There have been major advances in coastal modelling in the last decade, arising from advances in coastal observing systems, process understanding and computing power. This workshop will review the state-of-the-art in both diagnostic and prognostic coastal models, and identify promising approaches for further development and application. The workshop is intended to set the scene for a stand-alone workshop dedicated to this topic to be held later in 2005.

## Workshop 4. **Raising awareness and ownership of coastal management initiatives**

Convenor: **Jeremy Hills**

Co-convenor: **Don Alcock**

Capacity building and stakeholder communication programs are often an “after-thought” of ICZM initiatives. However, involvement of administrations, the public and key stakeholder groups is a vital to the success and sustainability of ICZM initiatives. Like good science, stakeholder involvement and interactive communication takes time, effort and resources. A strategic overview is needed to

engage key audiences and to use a mix of tools and techniques that are appropriate to relevant groups which deliver the required consensus or capacity outcomes. This workshop will evaluate case studies to show some approaches in action. An on-line Toolbox for capacity and consensus building will be demonstrated which assists managers in selecting appropriate tools and techniques for use within an overall strategy. By the end of the workshop the delegates should have a good understanding of the diversity of available tools for capacity and consensus building and be able to link them to enabling conditions for success and sustainability in ICZM initiatives.

**Session 7. Geohazards, ground water and risk**

Convenor: **Nalin Wikramanayake** Co-Convenor: **Evgeny Kontar**

Shelf zones and coastal zones are becoming major areas of industrial and technological development because of the growing human population in coastal regions and because of their store of natural resources such as fish, oil and gas. Therefore, understanding the risks of natural and human-made hazards in these areas assists to safeguard the populations in these regions and to strengthen the scientific and technological basis of a number of industries including oil and gas production and maritime transport. This session will focus on evaluation of risks of saltwater intrusion, contaminated submarine groundwater discharge and their influence on coastal oceanographic processes, submarine earthquakes, landslides, tsunamis, to produce a cohesive understanding of geo-risks and human-made hazards in coastal, shelf, and continental slope areas.

**Session 8. Ecosystems, land and sea use (Deltas)**

Convenor: **Yoshiki Saito** Co-Convenor: **James Syvitski**

Sediment-carrying rivers drop a significant portion of their load at their mouths, allowing nutrient-rich deltaic flood plains to form. These agriculturally productive regions are home to the competing factors of urbanization, food production and often become the intersection between terrestrial and seagoing transportation. Deltas support the world's largest wetland areas. Deltaic coasts are sensitive to the strong but competing influences of sea level fluctuations, accommodation space and sediment supply. Humans now strongly influence upstream sediment supply, and either directly or indirectly sea level change, resulting in coastal erosion. Conversion of natural wetlands (e.g. mangrove swamps) to agricultural land also influences the reach of storm surges, and separately the retention of sediment. Stop banks (levees) further decrease the nutrient supply to the delta plains. Deltaic coasts have been more vulnerable and need sustainability under human pressure.

**Session 9. Coastal waters ecohydrology: from the mountains to the coast**

Convenor: **Laura David** Co-Convenor: **Eric Wolanski**

Point and non-point source pollution throughout the river catchment, erosion, basin-wide land clearing, urbanisation, industrialisation, and other unsustainable human activities induce and perpetuate habitat loss, negative impacts on estuarine and coastal marine resources, and the loss of the ecological services that they provided. Of particular concern is the increasing number and capacity of dams in the watersheds, as well as, the growth of mega-harbours and mega-cities at the coast. Ecohydrology is an emerging problem-solving approach that involves addressing the whole catchment (including hydrological processes and biotic dynamics) as a single entity in order to

be able to understand the science (and hopefully promote sustainable management) of estuaries and the coastal zones. The temporal and spatial dimensions in such an approach spans a time frame from paleohydrological conditions to future global change scenarios and an understanding of the dynamic role of biota from cellular to basin scales.

**Session 10. Application of Remote Sensing for Coastal Area management**

Convenor: **Götz Flöser & Weigen Huang** Co-Convenor: **Paul DiGiacomo**

The coastal zone is a unique area where five major earth systems, the atmosphere, geosphere, hydrosphere, biosphere, and, in high latitude, the cryosphere overlap and are integrated. It has a special role from economic and environmental points of view. The need to understand the interactions linking land-ocean processes to climate in the coastal zone has become a matter of the most serious concern during the last two decades. Remote sensing is one of the important approaches to this concern. It has been used to monitor the coastal zone change and to study the interaction between land and ocean.

**Session 11. Integrated assessment of coastal change and management: Socio-economic modelling and future scenarios**

Convenor: **Kerry Turner** Co-Convenor: **Robert Nicholls**

This session focuses on the need for interdisciplinary approaches to the analysis of long term coastal change and its consequences for society. Speakers will concentrate on the use of scenario-based analysis, following the lead taken by groups such as IPCC. Such approaches first require the combining of natural science modelling outcomes (forcing parameters) and socio-economic driving pressures to provide predictions of the impacts on the environment and economy of the catchment/coast; the subsequent need is then for an analysis of the welfare consequences of the change process over the long run. Both developed and developing country contexts will be reviewed.

**Session 12. Dutch LOICZ**

Convenor: **Hans de Boois** Co-Convenor: **Carlo Heip**

In this session an overview will be presented of current Dutch research on coastal systems. Key aspects are the holistic nature of coastal systems on the one hand and the disciplinary character of research on the other. A multidisciplinary approach is a prerequisite to address the themes which are formulated for LOICZ-II, but the basic science is disciplinary.

**Workshop 5. Issues of scale in bridging the natural and social sciences**

Convenor: **Alison Gilbert** Co-Convenor: **Jan Vermaat**

Natural and social sciences, and disciplines within these broad categories, tend to have different perspectives on scale as well as different methods in dealing with environmental issues which span scales. The aims of this workshop are:

1. to examine our capability to deal with multiple scales when analysing coastal zone process, function and governance;
2. to identify incompatibilities between/among disciplines; and
3. to identify potential means of bridging them.

The workshop will not only be relevant for LOICZ, but it will also contribute LOICZ expertise to a current activity within IHDP's IDGEC project.

#### **Workshop 6. Conceptual synthesis of global coastal environments**

Convenor: **Bill Dennison**

Co-Convenor: **Don Alcock**

The aim of this half day workshop is to develop conceptual diagrams for the major coastal regions of the world. Regions will be large scale (eg NE Atlantic, Gulf of Mexico, Mediterranean, Caribbean Islands, West Africa, tropical Australia etc) and will capture key environmental processes, key environmental threats and key required management initiatives for each region. Diagrams will initially be drawn by hand and then converted to electronic format using the IAN symbol libraries in Adobe Illustrator (<http://www.ian.umces.edu/conceptualdiagrams.php>).

The workshop will run approximately as follows:

- ◆ 45 mins: introduction to conceptual diagrams and aims
- ◆ 1 hr 30 mins: working in predetermined regional groups, draw regional conceptual diagrams
- ◆ 45 mins: review conceptual diagrams from regions and plan continued effort

#### **Workshop 7. Integrating socio-economic variables in mapping and modelling material deliveries from catchment to coast**

Convenor: **Liana Talaue-Mcmanus**

Co-Convenor: **Deborah Balk**

This workshop will explore current approaches and methods in integrating spatially explicit socioeconomic variables in mapping and modelling deliveries of materials (sediments, nutrients, water) from the catchment to the coast. It will identify a list of mappable socioeconomic indicators that correlate with changes in land use, population, hydrology and coastal uses within various scenarios of economic development, at national and regional scales. In addition, the session/workshop will pinpoint existing datasets at regional and global scales that can be used to develop these indicators.

#### **Workshop 8. Marine Protected Areas – a management tool for ICZM?**

Convenor: **Jackie Alder**

Co-convenor: **Ron Johnstone**

Marine protected areas (MPAs) are an increasingly popular management tool with multiple ecological and social goals. They are a societally constructed management intervention requiring increased understanding as such. Specifically, there is a need to apply rigorous integrated social and natural science to increase our understanding of the human dimensions of MPAs and to improve their design, implementation, and monitoring. Conflict, diffusion of innovations, and social movements in support of MPAs are important phenomena warranting immediate attention.

#### **Session 13. Coastal assessments**

Convenor: **Laurence Mee**

Co-convenor: **Veerle van der Weerd**

Modern approaches to marine and coastal management such as Ecosystem Based Management (EBM) and Adaptive Management are heavily reliant on our ability to assess the changing state of the environment, the pressures and socio economic drivers that produce state changes, the social and economic impacts of change and the

governance structures, stakeholder attitudes and financial scope to respond to undesirable change. The concept of environmental assessment has moved from a static snapshot of pollution or biological community structure, to a more comprehensive and dynamic systems approach. Techniques for doing this are relatively new however and it is a good time to share current knowledge and practice through the experience of practitioners in this area. The session will benefit from a diverse group of specialists working in local, national and transboundary contexts, including several major international programmes.

#### Session 14. **Urbanisation**

Convenor: **Michel Meybeck**                      Co-Convenor: **Frauke Kraas**

Urbanization has been one of the key drivers of Global Change over the last 50 years. In the coastal zone it generally combines (i) the development of megacities, (ii) the industrialization, (iii) the construction of facilities for navigation, (iv) the artificialization of the coastline, particularly as a result of mass tourism. These pressures have induced specific environmental issues as the direct release of liquid solid and atmospheric wastes to the coast, with and without adequate treatment, the profound modification of the aquatic habitat and shoreline through harbour construction, channelization of estuaries and deltas, wetland filling. The natural filter functions of the coast are therefore very much altered by urbanization, particularly in deltas and river flood plain regions. In addition to these direct impacts groundwater overpumping in deltaic aquifers and subsequent land subsidence and salt wedge intrusion is commonly observed. Land-use change around megacities (e.g. for suburban development, for fuel wood consumption) can also lead to dramatic changes in water, sediment and nutrients transfers from land to the coast through rivers.

In addition to these issues, most coastal megacities are built up in lowlands sensitive to sea level rise. The management of coastal urban area should consider these multiple conflicting uses together with an Earth System approach at the local to regional scale. Even if appropriate Human responses from coastal stakeholders are taken to alleviate environmental pressures, coastal managers are faced with long-term inherited issues as pollution hot spots in sediments, fate of contaminated dredged material, severe deteriorations of coastal habitats and food chains etc.

The session should privileged the analysis of multiple urban pressures and their ecological and economic impacts on the coastal resources as well as the modification of coastal filters, the development of indicators of changes that can be used to scale, map and assess the evolution of these issues, and the best governance to manage these questions.

#### Session 15. **Nutrient flux to the coastal zone: trends and implications**

Convenor: **Nancy Rabalais**                      Co-Convenor: **Sybil Seitzinger**

Accelerated nutrient flux from water- and airsheds is becoming a major, global environmental problem in estuarine and coastal waters linked to landscapes with population growth and their activities, a focusing of the populace in coastal regions and agriculture expansion. Humans have altered cycles of nitrogen and phosphorus over large regions and increased the mobility and availability of these nutrients to coastal ecosystems. It is likely that coastal nutrient over-enrichment will continue to expand globally given the trajectories of future nutrient loads both in developed and developing countries. Changes in nutrient flux cannot be de-coupled from changes in

hydrology, sediment loads, and climate. Understanding these complex interactions is imperative in efforts to target, by time and type, nutrient loads to coastal systems.

**Session 16. Shelf processes and Earth system**

Convenor: **Helmuth Thomas** Co-Convenor: **Dileep Kumar & Jack Middelburg**

This session will be jointly convened by LOICZ, IMBER and SOLAS. The session intends to identify joint interests and to initialise joint implementation strategies for coastal zone research, this including the land and atmospheric communities in order to address this issue as comprehensive as possible.

**Session 17. Coastal Ecosystem Governance**

Convenor: **Stephen Olsen** Co-Convenor: **Alejandro Robles**

Governance is the process by which human societies negotiate the purposes, the rules and the procedures by which they regulate their activities and distribute power, access to resources and wealth. All governance systems are driven by the values that reflect what a society believes to be important. Governance systems are also shaped by the ecosystems in which a society lives as well as by their relationships with other societies with which they interact. Together these combine to form perceptions of how the world works and how an individual or group fits within their context. When considering the issues posed by the governance of a coastal ecosystem a first step is to understand how the associated population perceives the past trajectory of change and articulates goals for a desirable future. The analysis of governance systems is directed at understanding how the planning and decision making process relates to expressions of ecosystem change at a range of interconnected spatial and temporal scales.

**Session 18. Coastal typologies and datasets**

Convenor: **Dennis Swaney** Co-Convenor: **Bob Buddemeier**

The LOICZ environmental dataset, a global dataset of environmental variables at ½ degree resolution, was developed during LOICZ I to form a basis for categorizing coastal and marine environments at global and regional scales. LOICZview, a sophisticated, online interactive software tool for statistically classifying such data, was developed in tandem assist environmental scientists in developing such typologies. During the last 10 years, with the rise of GIS software and increasing availability of satellite imagery, we have seen an explosive growth in global and regional environmental data developed for many purposes. This session welcomes presentations on new datasets, typologies, and analytical tools developed either independently or with LOICZ, including presentations on:

- ◆ Global and regional datasets relevant to the coastal zone
- ◆ New typological analyses of the coastal zone
- ◆ Addressing scaling questions (i.e. upscaling and downscaling beyond the resolution of the data)
- ◆ Technical (data analysis) issues related to developing typologies
- ◆ Governance and policy implications of coastal classifications

### Workshop 9 **Coastal assessments**

Convenor: **Laurence Mee**

Co-Convenor: **Martin Adriaanse**

Modern approaches to marine and coastal management such as Ecosystem Based Management (EBM) and Adaptive Management are heavily reliant on our ability to assess the changing state of the environment, the pressures and socio economic drivers that produce state changes, the social and economic impacts of change and the governance structures, stakeholder attitudes and financial scope to respond to undesirable change. The concept of environmental assessment has moved from a static snapshot of pollution or biological community structure, to a more comprehensive and dynamic systems approach. Techniques for doing this are relatively new however and it is a good time to share current knowledge and practice through the experience of practitioners in this area. The session will benefit from a diverse group of specialists working in local, national and transboundary contexts, including several major international programmes.

### Workshop 10. **Gauging Progress In Coastal Governance**

Convenor: **Stephen Olsen**

Co-Convenor: **Peter Burbridge**

Long-term and effective coastal governance is the major factor limiting progress towards the goal of more sustainable forms of coastal development. Science informs the processes of governance, but rarely drives them. Adequate funding is also essential but much that is allocated to improved coastal ecosystem planning and decision making is squandered. This session explores the concepts and tools for developing governance baselines and monitoring progress towards unambiguous goals that define desired societal and environmental conditions in a manner that encourages learning and adaptation. It will explore the interaction between the natural and social sciences and the processes by which coastal governance evolves and responds to new knowledge. Conclusions will be drawn on best and worst practices and recommendation will be made.

### Workshop 11. **From river to coast: Collaboration between GWSP and LOICZ**

Convenors: **Joe Alcamo/Michel Meybeck** Co-convenors: **Nancy Rabalais/Eric Craswell**

This workshop is by invitation only and is an opportunity for the Global Water Systems Project and LOICZ to discuss areas of mutual interest and collaboration for their future research activity.

### Workshop 12. **Implementation, Integration, and Participation: Strategies for LOICZ II**

Convenor: **Bob Buddemeier**

Co-Convenor: **Bruce Maxwell**

The workshop will consider how to preserve, expand on, and augment the successful techniques of LOICZ I in addressing the topics of LOICZ II, building on the preceding sessions and workshops to develop specific recommendations. Productive experience with database development and typology applications in LOICZ I will provide a basis for addressing communication, information infrastructure, and shared resources as critical elements in building both community and capacity while addressing the scientific goals. Implementation strategies will need to address the increased diversity and sophistication of both scientific goals and available technology. In addition to action recommendations, desirable workshop products

include initial formulation of proposals for infrastructure support, and identification of issues to address in a possible follow-up workshop on typology and data/information resource needs.



## Participants List

Dr Stefan Aarninkhof  
Netherlands  
Telephone: 31 0 15 285 8999  
Fax: 31 0 15 285 8582  
Email: Stefan.Aarninkhof@wldelft.nl  
www: www.nckweb.org

Dr.Bulent Acma  
Anadolu University, Department of  
Economics, Unit of  
Southeastern Anatolia Project GAP,  
Yunusemre Campus  
26470 Eskisehir/TURKEY  
Telephone: 90 222 3350580ext.6171  
Fax: 90 222 3353616  
Email: bacma@anadolu.edu.tr  
www:  
<https://home.anadolu.edu.tr/bacma>

Martin Adriaanse  
UNEP/GPA  
P.O. Box 16227 2500 BE  
The Hague  
The Netherlands  
Teephonel: +31 70 311 4466  
Fax: +31 70 345 6648  
Email: m.adriaanse@unep.nl

Ms. Joana D. Akrofi  
Division of Early Warning and  
Assessment (DEWA)  
United Nations Environment  
Programme (UNEP)  
P. O. BOX 30552  
Nairobi  
Kenya  
Telephone: + 254 2 62 3503  
Fax: + 254 2 62 2798  
Email: Joana.Akrofi@unep.org

Prof. Dr. Joseph Alcamo  
Director Center for Environmental  
Systems Research University of Kassel  
Kurt Wolters Strasse 3  
D-34125 Kassel  
Germany  
Telephone: +49 561 804 3898  
Fax: +49 561 804 7266  
Email: alcamo@usf.uni-kassel.de

Don Alcock  
80 Meiers Rd  
Indooroopilly  
Brisbane  
Australia  
Telephone: 61 7 3362 9373  
Fax: 61 7 3362 9372  
Email: don.alcock@nrm.qld.gov.au  
www: www.coastal.crc.org.au

Jacqueline Alder  
Sea Around Us Project  
Fisheries Centre, UBC  
2259 Lower Mall Road  
Vancouver, BC V6T 1Z4  
Canada  
Telephone: 1-604-822-6903  
Fax: 1-604-822-8934  
Email: j.alder@fisheries.ubc.ca

Dr. Saber Al Rousan  
Marine Science Station  
P.O.Box 195  
77110 Aqaba, JORDAN  
Telephone: 962 3 2015145  
Fax: 962 3 2013674  
Email: s.rousan@ju.edu.jo

Christos Anagnostou  
Institute of Oceanography  
P.O.Box 712  
19013 Anavissos  
Attika  
Greece  
Telephone: +30 22910 76369  
Email: [chanag@ath.hcmr.gr](mailto:chanag@ath.hcmr.gr)  
www: <http://www.hcmr.gr/>

Apichart Anunkularmpai  
Kuwait

Ricardo Araki  
Caixa Postal 6152  
Baro Geraldo UNICAMP  
Campinas So Paulo  
CEP 13083970  
Telephone: 55 19 3788 4653 or 4570  
Fax: 55 19 32891562  
Email: [ricardo.araki@ige.unicamp.br](mailto:ricardo.araki@ige.unicamp.br)  
www: <http://www.ige.unicamp.br/>

Russell Arthurton  
5A Church Lane  
Grimston  
Melton Mowbray  
Leics LE14 3BY UK  
Telephone: 44 1664 810024  
Email: [r.arthurton@btinternet.com](mailto:r.arthurton@btinternet.com)  
www:  
[www.r.arthurton.btinternet.co.uk](http://www.r.arthurton.btinternet.co.uk)

Dr. Armin Aulinger  
MaxPlanckStrasse 1  
21502 Geesthacht  
Germany  
Telephone: 494152872335  
Fax: 494152872332  
Email: [aulinger@gkss.de](mailto:aulinger@gkss.de)

Denis Bailly  
12, rue de Kergoat  
CS  
29 Brest cedex 3  
France  
Telephone: 33 2 98 01 69 33  
Fax: 33 2 98 01 69 35  
Email: [denis.bailly@univbrest.fr](mailto:denis.bailly@univbrest.fr)

Dr. Deborah Balk  
Columbia University  
CIESIN Center for International Earth  
Science Information  
Network  
PO Box 1000  
Palisades, NY 10964 USA  
Telephone: 8453658965  
Fax: 8453658922  
Email: [dbalk@ciesin.columbia.edu](mailto:dbalk@ciesin.columbia.edu)  
www: [www.ciesin.columbia.edu](http://www.ciesin.columbia.edu)

Bailly Denis  
Seferi 4  
Agia Paraskevi 15342  
Greece  
Telephone: (+30) 210 600 72 66  
Email: [denis.bailly@univ-brest.fr](mailto:denis.bailly@univ-brest.fr)

Rhoda Ballinger  
School of Earth, Ocean and Planetary  
Sciences  
Cardiff University  
Main Building  
Park Place  
Cardiff  
CF10 3YE  
Telephone: +44 29 2087 6671  
Email: [BallingerRC@cardiff.ac.uk](mailto:BallingerRC@cardiff.ac.uk)

Mr. Andrea Barbanti  
Thetis s.p.a. Castello 2737/f, 30122  
Venice  
Italy  
Telephone: 390412406101  
Fax: 390415210292  
Email: andrea.barbanti@thetis.it  
www: thetis.it

Gabriella Bartholini  
Via Pola, 4  
71010 Lesina FG  
Italy  
Telephone: 39 0882 992705  
Fax: 39 0882 991352  
Email:  
gabriella.bartholini@fg.ismar.cnr.it

Alberto Basset  
Department of Biological and  
Environmental Sciences and  
Technologies  
University of Lecce  
Ecotekne, SP Lecce Monteroni, 73100  
Lecce  
Telephone: 39 832 298606  
Fax: 39 832 298722  
Email: alberto.basset@unile.it

Stefano Belfiore  
Intergovernmental Oceanographic  
Commission of UNESCO  
1, rue Miollis  
75015 Paris  
France  
Telephone: 33 1 45 68 40 68  
Fax: 33 1 45 68 58 12  
Email: s.belfiore@unesco.org  
www:  
<http://ioc.unesco.org/iocweb/index.php>

Leah Bendell Young  
Department of Biological Sciences

Simon Fraser University  
8888 University Ave.  
Burnaby, B.C. V5A 1S6  
Telephone: 6042915621  
Fax: 6042913496  
Email: bendell@sfu.ca

Justus van Beusekom  
Alfred Wegener Institute for Polar and  
Marine Research  
Wadden Sea Station Sylt  
Hafenstrasse 43  
D25992 List/Sylt  
Germany  
Telephone: 49 4651 956 151  
Fax: 49 4651 956 200  
Email:  
jbeusekom@awibremerhaven.de  
www:  
<http://www.awibremerhaven.de/Benthic/CoastalEco/>

H Biswas  
Department of Marine Science  
University of Calcutta  
35 B. C Road  
Calcutta 700 019  
West Bengal  
India  
Email: bhaimanti@hotmail.com

S Bock  
EUCC-The Coastal Union Germany  
Poststr. 6  
18119 Rostock-Warnemünde  
Germany  
Email: steffen.bock@eucc-d.de

Hans de Boois  
PO.Box 93510  
2509 AM The Hague  
The Netherlands

Telephone: 31 70 3440 752  
Fax: 31 70 3819033  
Email: boois@nwo.nl  
www: www.nwo.nl

Gerben Boot  
WL Delft Hydraulics  
P.O.Box 177  
2600 MH Delft  
The Netherlands  
Telephone: 31 0 15 285 8966  
Fax: 31 0 15 285 8582  
Email: gerben.boot@wldelft.nl  
www: www.wldelft.nl

Tomasz Boski  
Universidade do Algarve  
CIMA FCMA  
Campus de Gambelas  
8000 Faro, Portugal  
Telephone: 351 289800926  
Fax: 351 289818353  
Email: tboski@ualg.pt  
www: <http://www.ualg.pt/cima>

Gerhard Breulmann  
c/o INPE, Av. Dos Astronautas 1758,  
Sao Jose dos Campos SP, 12227010  
Brazil  
Telephone: 551239456865  
Fax: 551239414410  
Email: Gerhard@dir.iai.int  
www: www.iai.int

David Brewer  
CSIRO Marine Research  
PO Box 120,  
Cleveland, QLD 4163  
Australia  
Telephone: 61 7 3826 7246  
Fax: 61 7 3826 7222  
Email: david.brewer@csiro.au  
www: www.marine.csiro.au

Maria Jos Brogueira  
IPIMAR/DAA  
Av. Brasilia  
1449006 Lisboa  
Portugal  
Telephone: 351 213027006  
Fax: 351 213015948  
Email: mzb@ipimar.pt

Antje Bruns  
Research Technology Centre  
Westcoast  
Hafentrn 1  
25761 Bsum  
Germany  
Telephone: 49 04834 / 604216  
Fax: 49 04834 / 604299  
Email: bruns@ftzwest.unikiel.de  
www: www.coastalfutures.de

Bob Buddemeier  
Dr. Robert W. Buddemeier  
Kansas Geological Survey  
University of Kansas  
1930 Constant Avenue  
Lawrence, KS 66047 USA  
Telephone: 1 785 8642112  
Fax: fax 1 785 8645317  
Email: Email: buddrw@ku.edu

Professor Stuart E. Bunn  
Centre for Riverine Landscapes  
Griffith University  
Nathan, Queensland, Australia, 4111  
Telephone: 617 38757407  
Fax: 617 38757615  
Email: S.Bunn@griffith.edu.au  
www:  
www.gu.edu.au/centre/riverlandscapes

Prof. Peter Burbridge  
The Orchard, House of Ross  
Comrie, Perthshire PH6 2JS  
United Kingdom  
Phone: +44-1764 670 900  
Fax: +44-1764 670 981  
E-mail: p.r.burbridge@ncl.ac.uk or  
Peter\_Burbridge@yahoo.co.uk

Dr. Benjamin Burkhard  
Ecology Centre, University of Kiel  
Olshausenstr. 40  
24098 KIEL, Germany  
Telephone: 49 431 880 1230  
Fax: 49 431 880 4083  
Email: bburkhard@ecology.unikiel.de  
www:  
www.ecology.unikiel.de/bburkhard/

Ms. Nahida al-Majed BuTayban  
Kuwait  
Graça Cabeçadas  
IPIMAR/DAA  
Av. Brasília  
1449-006 Lisboa  
Portugal  
Telephone: +351 213027006  
Fax: +351 213015948  
Email: gc@ipimar.pt

Dr. Mabec Campos  
Southeast Asian Regional Center for  
Graduate Study and  
Research in Agriculture SEARCA  
College, Laguna  
Philippines  
Telephone: 63 49 536 2290 Loc. 417  
Fax: 63 49 536 4105  
Email: lamonbay@agri.searca.org,  
cmaribec@yahoo.com  
www: www.searca.org

Tim Carruthers  
2020 Horns Point Rd  
Cambridge  
MD 21613  
USA  
Telephone: 1 410 228 9250 ext 654  
Fax: 1 410 228 3843  
Email: tcarruth@umces.edu  
www: www.ian.umces.edu

So Min Cheong  
University of Kansas, Department of  
Geography  
1475 Jayhawk Blvd, Lawrence, KS  
660457613  
Telephone: 785.864.5144  
Fax:  
Email: somin@ku.edu  
www:

Franciscus Colijn  
GKSS Research Centre, Institute for  
Coastal Research  
Max Planck Strasse 1, 21502  
Geesthacht, Germany  
Telephone: 494152871533  
Fax: 494152872020  
Email: colijn@gkss.de  
www: www.gkss.de

Flaviano Collavini  
Istituto di Scienze Marine CNR  
San Polo 1364  
30125 Venezia  
Italy  
Telephone: 39 041 5216880  
Fax: 39 041 5216815  
Email: f.collavini@ismar.cnr.it  
www: www.ismar.cnr.it

Dr Sarah Cornell  
QUEST  
Department of Earth Sciences  
University of Bristol  
Bristol BS8 1RJ UK  
Telephone: 44 0117 331 5136  
Fax: 44 0117 925 3385  
Email: sarah.cornell@bristol.ac.uk  
www: <http://quest.bris.ac.uk>

Leticia C. da Cunha  
Max Planck Institute for  
Biogeochemistry  
Dynamic Green Ocean Project  
HansKnoellStrasse 10  
D07745 Jena  
Germany  
Telephone: 493641576215  
Fax: 493641577200  
Email: lcotrim@bgcjena.mpg.de  
www:  
[www.bgcjena.mpg.de/bgcsynthesis/projects/greenocean/index.shtml](http://www.bgcjena.mpg.de/bgcsynthesis/projects/greenocean/index.shtml)

Dr. Eric Craswell  
Global Water System Project GWSP  
International Project Office  
WalterFlexStrasse 3  
53113 Bonn, Germany  
Telephone: 49 0228736187  
Fax: 49 02287360834  
Email: Eric.Craswell@unibonn.de  
www: [www.gwsp.org](http://www.gwsp.org)

Chris Crossland  
1499 David Low Way  
Yaroomba Q4573  
Australia  
Telephone: 61754730768  
Fax: 61754739768  
Email: jcross@gil.com.au

Laura T. David  
Marine Science Institute  
University of the Philippines, Diliman  
Quezon City 1101  
Philippines  
Telephone: 6329223962  
Fax: 6329247678  
Email: ldavid@upmsi.ph  
www: <http://www.msi.upd.edu.ph>

Heinen De Carlo  
Department of Oceanography  
SOEST  
University of Hawaii at Manoa  
Honolulu  
HI 96822  
USA  
Email: edecarlo@soest.hawaii.edu

Dr. Karine Dedieu  
Laboratoire des Sciences du Climat et  
de l'Environnement  
Unit Mixte de Recherche CNRSCEA  
Domaine du CNRS Bat 12  
Avenue de la Terrasse  
F91198 GifsurYvette France  
Telephone: Tel:33169.82.43.39  
Fax: Fax:33169.82.35.68  
Email: Karine.Dedieu@lsce.cnrs.gif.fr  
/  
karinededieu@gmail.com

Juan Jos Del Toro  
Circunvalacin Oriente 135  
Ciudad Granja  
Zapopan,Jalisco Mxico  
Telephone: 52 3633273374  
Fax: 52 3633273374  
Email: jdeltoro1973@yahoo.com

Nicolette Demetriades  
P.O. Box 417  
Hyper by the Sea  
4053  
Telephone: 27 31 572 2705  
Fax: 27 31 572 5171  
Email: nicolette@mer.co.za

Darren Dennis  
CSIRO Marine Laboratories,  
233 Middle Street,  
Cleveland, Queensland,  
Australia, 4163.  
Telephone: 61 7 38267248  
Fax: 61 7 38267222  
Email: Darren.dennis@csiro.au

Dr William C. Dennison  
University of Maryland  
Center for Environmental Science  
P.O.Box 775  
Cambridge, MD 21613-0775  
USA  
Phone: +1 410 228 9250 x 608  
Fax: +1 410 228 3843  
E-mail: [dennison@umces.edu](mailto:dennison@umces.edu)

Paul M. DiGiacomo  
Jet Propulsion Laboratory  
California Institute of Technology  
MS 301165  
4800 Oak Grove Drive  
Pasadena, CA 911098099 USA  
Telephone: 18183548189  
Fax: 18183939815  
Email:  
Paul.M.Digiacom@jpl.nasa.gov

Enrico Dinelli  
CIRSA, Interdepartmental centre for  
environmental sciences  
University of Bologna  
Via Sant Alberto 163  
48100 Ravenna Italy  
Telephone: 390544937341  
Fax: 390544937311  
Email: enrico.dinelli@unibo.it

Lindy Dingerson  
PO Box 1346  
1208 Greate Rd  
Virginia Institute of Marine Science  
Gloucester Point, VA 23062  
Telephone: 804 6847140  
Email: lynne@vims.edu

Dr. Hans Dürr  
UMR Sisyphe  
Universit Pierre et Marie Curie Paris  
VI  
4, pl. Jussieu, Case 105  
75252 Paris Cedex 05, France  
currently at :  
ESA Ecologie des Systmes Aquatiques  
Universit Libre de Bruxelles  
Campus Plaine CP 221  
B1050 Bruxelles, Belgium  
Telephone: 3301 44 27 51 22  
Fax: 3301 44 27 45 88  
Email: Hans.Duerr@ccr.jussieu.fr /  
Hans.Duerr@ulb.ac.be  
www: <http://www.sisyphe.jussieu.fr/>

Werner Ekau  
International Ocean Institute IOI  
International Ocean Institute  
Operational Centre Germany  
c/o Centre for Tropical Marine  
Ecology  
28359 Bremen Germany  
Telephone: 494212380023  
Fax: 494212380030  
Email: [wekau@zmt.unibremen.de](mailto:wekau@zmt.unibremen.de)  
www: [zmtbremen.de](http://zmtbremen.de)

Susannah Elliott  
Deputy Director, Communications  
IGBP Secretariat  
Royal Swedish Academy of Sciences  
Box 50005  
S-104 05 Stockholm  
Sweden  
Tel: +46-8-16-64-48  
Fax: +46-8-16-64-05  
Email: [susannah@igbp.kva.se](mailto:susannah@igbp.kva.se)

George Emery  
National Research Council Canada  
Room E1 - 131, Building M-58  
1200 Montreal Road  
Ottawa, Ontario, K1A 0R6  
Telephone: 613-993-4868  
Fax: 613-941-0986  
Email: [George.Emery@nrc.ca](mailto:George.Emery@nrc.ca)

Edgar E. Gutiérrez Ezpeleta  
Observatorio del Desarrollo de la  
Universidad de Costa Rica  
2060 San Pedro de Montes de Oca  
Costa Rica  
Telephone: (+506) 207-3325, 207-  
3327  
Fax: (+506) 207-3329  
Email: [egutierr@cariari.ucr.ac.cr](mailto:egutierr@cariari.ucr.ac.cr)

TA Essens  
Email: [tjl.essens@gmail.com](mailto:tjl.essens@gmail.com)  
Virginia Fernandez Ramos  
Igua 4225  
Piso 14 Ala Sur.  
Montevideo  
Uruguay  
Telephone: 598 2 525 1552  
Fax: 598 2 411 4180  
Email: [vivi@fcien.edu.uy](mailto:vivi@fcien.edu.uy)  
www:  
<http://ltaat.fcien.edu.uy/indexa.htm>

Sergio Ferrari  
International Centre for Hydrology D.  
Tonini  
Via Loredan, 20  
35131 Padova  
Italy  
Telephone: 390498275445  
Fax: 390498275446  
Email: [ferrari@idra.unipd.it](mailto:ferrari@idra.unipd.it)  
www: [www: www.image.unipd.it](http://www.image.unipd.it)



Dr. Götz Flöser  
Institute of Coastal Research, GKSS  
Research Centre  
MaxPlanckStrasse 1  
D 21502 Geesthacht  
Germany  
Telephone: 49 4152 87 2345  
Fax: 49 4152 87 2332  
Email: Floeser@gkss.de  
www: <http://coast.gkss.de/loicz>

Martha Liliana Fontalvo Herazo  
Fahrenheitstrs. 6, 28359 Bremen,  
Germany  
Telephone: 49 0 421 2380049  
Fax: 49 0 421 23800  
Email: fontalvo@unibremen.de

Ticky Forbes  
School of Biology and Conservation  
Sciences  
University of KwaZulu Natal, Durban  
4041  
Telephone: 27 31 572 2705  
Fax: 27 31 572 5171  
Email: ticky@mer.co.za

Dr. Miguel D. Fortes  
The Marine Science Institute  
Velasquez St. College of Science  
University of the Philippines  
Diliman, Quezon City, Philippines  
Telephone: (63-2) 922-3959  
Fax: + 662 561 5118 (Bangkok) &  
(63-2) 924-7678  
Email: fortesm@upmsi.ph

Andrea Florella Ribeiro Franco  
Dept. Cincias e Engenharia do  
Ambiente  
Faculdade de Cincias e Tecnologia  
Quinta da Torre  
2829516 Monte de Caparica  
PORTUGAL  
Telephone: 351212948300 X 10117  
Fax: 351212948554  
Email: andrea@ecowin.org  
www: [ecowin.org](http://ecowin.org)

Dr. Jana Friedrich  
Alfred Wegener Institute for Polar and  
Marine Research  
Am Handelshafen 12  
D-27570 Bremerhaven  
Telephone: +49 471 4831 1886  
Fax: +49 471 4831 1425  
Email: jfriedrich@awi-  
bremerhaven.de

Gary Fry  
PO Box 120  
Cleveland, Queensland 4163  
Australia  
Telephone: 61 7 3826 7202  
Fax: 61 7 3826 7222  
Email: gary.fry@csiro.au  
www: [www.marine.csiro.au](http://www.marine.csiro.au)

Patricia Gallagher  
8888 University Drive  
Burnaby  
British Columbia  
Canada V5A 1S6  
Telephone: 604 291 4653  
Fax: 604 291 3851  
Email: pgallaug@sfu.ca  
www: [www.sfu.ca/coastalstudies](http://www.sfu.ca/coastalstudies),  
[www.sfu.ca/cstudies/science](http://www.sfu.ca/cstudies/science)

Jeremy Gault  
Coastal Marine Resources Centre  
University College Cork  
Naval Base  
Haulbowline  
Cobh  
Co. Cork  
Ireland  
Telephone: 353 21 4703108  
Fax: 353 21 4703132  
Email: [j.gault@ucc.ie](mailto:j.gault@ucc.ie)  
www: <http://cmrc.ucc.ie/>

K. Gee  
Social Science Research Center Berlin,  
Reichpietschufer 50  
D-10785 Berlin  
Germany  
Email: [gee@wz-berlin.de](mailto:gee@wz-berlin.de),

Gianmarco Giordani  
Area Parco delle Scienze 33/A  
I43100 Parma  
Italy  
Telephone: 39 0521 905976  
Fax: 39 0521 905402  
Email: [giordani@nemo.unipr.it](mailto:giordani@nemo.unipr.it)  
www: <http://www.dsa.unipr.it>

Bernhard Glaeser  
Social Science Research Center Berlin  
WZB  
Reichpietschufer 50, D10785 Berlin  
Germany  
Telephone: 49 30 25491 286 /  
285assistant  
Fax: 4903025491219 / 254  
Email: [bglaeser@wzberlin.de](mailto:bglaeser@wzberlin.de)  
www: [wzberlin.de](http://wzberlin.de);  
[dghumanoekologie.de](http://dghumanoekologie.de); [ikzmoder.de](http://ikzmoder.de);  
[coastal](http://coastal)  
[futures.de](http://futures.de)

Marion Glaser  
Centre for Tropical Marine Ecology  
(ZMT)  
University of Bremen  
Fahrenheitstr. 6  
28359 Bremen  
Germany  
Email: [mglaser@zmt.uni-bremen.de](mailto:mglaser@zmt.uni-bremen.de)

Barbara Göbel  
Executive Director  
International Human Dimensions  
Programme on Global Environmental  
Change  
Walter-Flex-Str. 3  
53113 Bonn  
Germany  
Tel: +49-228-73 90 51  
Email: [Goebel.ihdp@uni-bonn.de](mailto:Goebel.ihdp@uni-bonn.de)

Beverly Goh  
Natural Sciences, National Institute of  
Education, Nanyang Technological  
University  
1 Nanyang Walk  
Singapore 637616.  
Email: [bgoh@nie.edu.sg](mailto:bgoh@nie.edu.sg)

Dr. Gomez-Gesteira  
Faculty of Sciences. University of  
Vigo. Campus As Lagoas.  
32004 Ourense Spain.  
Telephone: 34 988387232  
Fax: 34 988387227  
Email: [mggesteira@uvigo.es](mailto:mggesteira@uvigo.es)  
www: <http://webs.uvigo.es/ocean>

Genoveva Gonzalez Mirelis  
De Dageraad 1  
1797SK Den Hoorn  
The Netherlands  
Telephone: 31 0 626236822  
Fax: 31 0 222319235  
Email: genogonzalez@excite.com  
www:

Alison Gilbert  
Institute for Environmental Studies  
Vrije Universiteit,  
De Boelelaan 1087  
1085 HV Amsterdam, The Netherlands  
+31 20 598 9553  
+31 20 598 9553  
Alison.gilbert@ivm.falw.vu.nl  
//www.vu.nl/ivm

Prof. Chris Gordon  
Centre for African Wetlands  
P.O. Box LG 67  
University of Ghana, Legon  
Accra, Ghana  
Telephone: 233 21 512 835/6  
Fax: 233 21 512 837  
Email: afriwet@idngh.com  
www: www.afriwet.org

Sylvie Gunette  
University of British Columbia  
Fisheries Centre  
2259 Lower Mall  
Vancouver, BC, Canada  
V6T 1Z4  
Telephone: 1 604 8226348  
Fax: 1 604 8228934  
Email: s.guenette@fisheries.ubc.ca  
www:  
<http://www.marinemammal.org/MMR>  
U/sylvie.html

JennyLisa Harcourt-Baldwin  
Room 131  
Oceanography Department  
University of Cape Town  
Private Bag  
7700  
Cape Town  
Telephone: 27 021 650 3281  
Fax: 27 021 650 3979  
Email: baldwinj@ocean.uct.ac.za

Dr. Peter Harrison  
100 Sussex Drive  
Room 1010 East  
Ottawa, Ontario  
Canada K1A 0R6  
Telephone: 6139906982  
Fax: 6139911009  
Email: Peter.harrison@nrcnrc.gc.ca

Nick Harvey  
The University of Adelaide  
Adelaide  
South Australia, 5005  
Telephone: 61 8 8303 5923  
Fax: 61 8 8303 3372  
Email: nick.harvey@adelaide.edu.au

Ms. Sherry Heileman  
31 Rue Robert de Flers  
Paris 75015  
France  
Telephone: +33 1 40 59 08 34  
Email: sh\_heileman@yahoo.com

Carlo Heip  
Centre for Estuarine and Marine  
Ecology, NIOOKNAW  
POB 140  
4400 AC Yerseke  
The Netherlands  
Telephone: 31 113 577 445  
Fax: 31 113 573 616  
Email: c.heip@nioo.knaw.nl  
www: <http://www.nioo.knaw.nl>

Peter M.J. Herman  
Netherlands Institute of Ecology  
Centre for Estuarine and Marine  
Ecology  
P.B. 140  
4400 AC Yerseke  
The Netherlands  
Telephone: 31/113.577475  
Fax: 31/113.573616  
Email: p.herman@nioo.knaw.nl  
www: [www: www.nioo.knaw.nl](http://www.nioo.knaw.nl)

Kathy Hibbard  
Terrestrial Sciences Section  
National Center for Atmospheric  
Research  
Post Office Box 3000  
Boulder, CO 80305  
Telephone: +1 303.497.1706  
Fax: +1 303.497.1695  
Email: kathyh@ucar.edu

Dr Jeremy Hills  
Envision, Ridley Building,  
University of Newcastle upon Tyne,  
Newcastle, NE1 7RU,  
UK.  
Telephone: 44 0 191 222 6673  
Fax: 44 0 191 222 5095  
Email: J.Hills@Envision.uk.com  
www: [www: www.Envision.uk.com](http://www.Envision.uk.com)

Mike Hilton  
Department of Geography  
University of Otago  
PO Box 56  
Dunedin, New Zealand  
Telephone: 64 3 479 8778  
Fax: 64 3 479 9037  
Email: [mjh@geography.otago.ac.nz](mailto:mjh@geography.otago.ac.nz)  
www: [www: www.geography.otago.ac.nz](http://www.geography.otago.ac.nz)

Jochen Hinkel  
Potsdam Institute for Climate Impact  
Research PIK  
P.O. Box 601203  
14412 Potsdam  
Telephone: 493312882598  
Fax:  
Email: [hinkel@pikpotsdam.de](mailto:hinkel@pikpotsdam.de)

Prof. dr. Piet Hoekstra  
Institute for Marine and Atmospheric  
Research Utrecht IMAU  
Department of Physical Geography  
Faculty of Geosciences Utrecht  
University  
Heidelberglaan 2 P.O. Box 80.115  
3508 TC Utrecht  
Netherlands  
Telephone: 31 30 2532753 / 2532749  
secr  
Fax: 31 30 2531145  
Email: [p.hoekstra@geo.uu.nl](mailto:p.hoekstra@geo.uu.nl)  
www: [Coastalresearch.nl](http://Coastalresearch.nl)

Dr Weigen Huang  
Director of Division of Marine Remote Sensing  
Deputy Director of Lab. of Ocean Dynamic  
Processes and Satellite Oceanography  
Second Institute of Oceanography  
State Oceanic Administration  
Hangzhou  
Zhejiang 310012  
China  
Telephone: +86 571 88064274  
Fax: +86 571 88839374  
Email: wghuang@mail.hz.zj.cn or lopso@mail.hz.zj.cn

JiaJang JJ Hung  
Institute of Marine Geology and Chemistry  
National Sun YatSen University  
Kaohsiung  
Taiwan  
Telephone: 88675255147  
Fax: 88675255130  
Email: hungjj@mail.nsysu.edu.tw  
www: www2.nsysu.edu.tw/mgac/

John Huthnance  
Proudman Oceanographic Laboratory  
Joseph Proudman Building  
6 Brownlow Street  
Liverpool L3 5DA, UK  
Telephone: 44 151 795 4852  
Fax: 44 151 795 4801  
Email: jmh@pol.ac.uk  
www: http://www.pol.ac.uk

Dr.R.Jaganathan  
Reader  
Department of Geography  
University of Madras  
Chennai600005

India  
Telephone: 91 44 25368778 ext.303  
Res 91 44 24617006  
Fax: 91 44 25366693  
Email: rjnathan@hotmail.com,  
rjnathan@unom.ac.in

Robert James  
National Research Council of Canada  
1200 Montreal Road, Bldg. M-58  
Ottawa, Ontario  
Canada K1A 0R6  
Telephone: +1 613 990-7381  
Email: Rob.James@nrc-cnrc.gc.ca

Dr. Upali Jayawardena  
Department of Civil Engineering,  
Faculty of Engineering,  
University of Peradeniya  
Peradeniya  
Sri Lanka  
Telephone: 94 81 2388029  
Fax: 94 81 2388158  
Email: udsj@pdn.ac.lk

Dr. MarcinFilip Jedrzejczak  
c/o Warsaw Independent Ltd.  
Al. Jerozolimskie 125/127 pok. 220  
02017 Warsaw  
Poland  
Telephone: 48 601 662444  
Fax: 48 22 628 9666  
Email: humbak@praeter.pl

Dr. Ljubomir Jeftic  
Nova Ves 81  
10000 Zagreb  
Croatia  
Telephone: +385 1 466 7662  
Fax: +385 1 466 7662  
Email: ljubomir.jeftic@zg.htnet.hr

Mike Jennings  
Zoology and Entomology Department  
Rhodes University  
PO Box 94  
Grahamstown  
South Africa  
6140  
Telephone: 27 46 622 8525  
Fax: 27 46 622 8959  
Email: g04j5653@campus.ru.ac.za  
www:  
<http://www.ru.ac.za/academic/departments/zooento>

Assoc. Prof. Ron Johnstone  
Centre for Marine Studies,  
University of Queensland, St Lucia,  
4072, Qld. Australia  
Telephone: 61 07 33654333  
Fax: 61 07 33654755  
Email: rnje@uq.edu.au  
www: [www.marine.uq.edu.au](http://www.marine.uq.edu.au)

Mildred Jourdan  
P.O. Box 59  
1790 AB  
Den Burg, Texel  
The Netherlands  
Telephone: 310222369433  
Fax:  
Email: mildred@nioz.nl  
www: [www.nioz.nl](http://www.nioz.nl)  
Saa Kabuta  
Kortenaerkade 1  
Postbus 20907  
2500 EX The Hague  
The Netherlands  
Telephone: 0031703114201  
Fax: 0031703114300  
Email:  
[s.h.kabuta@rikz.rws.minvenw.nl](mailto:s.h.kabuta@rikz.rws.minvenw.nl)  
www: [www.RIKZ.nl](http://www.RIKZ.nl)

Andreas Kannen  
Hafentoern 1  
Telephone: 49 04834 604121  
Fax: 49 04834 604299  
Email: [kannen@ftzwest.unikiel.de](mailto:kannen@ftzwest.unikiel.de)  
www: [www.unikiel.de/ftzwest/](http://www.unikiel.de/ftzwest/)

Ms Zacharo Kavakli  
Department of Marine Sciences,  
University of the Aegean,  
Mytilini, Lesvos, 81100, Greece  
Telephone: 302251036811  
Fax: 302251036809  
Email: [zkavakli@marine.aegean.gr](mailto:zkavakli@marine.aegean.gr)  
www:  
<http://marineserver2.aegean.gr/marine/>

Prof. Dieter Kelletat  
Email: [Dieter.kelletat@uniessen.de](mailto:Dieter.kelletat@uniessen.de)

Abdellatif Khattabi  
Ecole Nationale Forestiere d Ingnieurs  
BP. 511 Tabrikt  
Sale  
Morocco  
Telephone: 212 61 21 08 54  
Fax: 212 37 86 11 49  
Email: [akhattabi@Email.com](mailto:akhattabi@Email.com)

Wim Klaassen  
Marine Biology  
University of Groningen  
PO Box 14, Haren  
The Netherlands  
Telephone: 31 50 3636141  
Email: [W.Klaassen@rug.nl](mailto:W.Klaassen@rug.nl)  
www:  
<http://www.rug.nl/biologie/onderzoek/onderzoekgroepen/marieneBiologie/index>

Richard J.T. Klein  
P.O. Box 601203  
14412 Potsdam  
Germany  
Telephone: 49 331 2882651  
Fax: 49 331 2882642  
Email: richard.klein@pikpotsdam.de  
www:  
<http://www.pikpotsdam.de/richardk>

Prof. Dr. Bastiaan A. Knoppers  
Departamento de Geoquímica  
Universidade Federal Fluminense  
Morro do Valonguinho s/n  
24020007 Niteri, RJ, Brazil  
Telephone: 552126292210  
Fax: 552126292234  
Email: geoknop@geoq.uff.br  
www: [www.uff.gov.br](http://www.uff.gov.br)

Lawrence Koe  
Environmental Engineering Research  
Centre  
Nanyang Technological University  
50 Nanyang Avenue,  
SINGAPORE 639798  
Telephone: 65 67904773  
Fax: 65 67927319  
Email: ccckoe@ntu.edu.sg  
www: <http://www.ntu.edu.sg/cee/>

Isao Koike  
Nakano, Tokyo 1648639  
Japan  
Telephone: 81353516460  
Fax: 81353516461  
Email: koike@ori.utokyo.ac.jp

Prof. Evgeny A. Kontar  
P.P. Shirshov Institute of Oceanology,  
Russian Academy of  
Sciences

36, Nakhimovsky prospect, Moscow  
117851, Russia  
Telephone: 7 095 1292181  
Fax: 7 095 1245983  
Email: [ekontar@ocean.fsu.edu](mailto:ekontar@ocean.fsu.edu)  
www:  
<http://www.jhu.edu/scor/wg112front.htm>  
<http://www.iugg.org/iapso/comm.html>,  
<http://www.sio.rssi.ru/>

Frauke Kraas  
Department of Geography, University  
of Cologne  
AlbertusMagnusPlatz  
50923 Kln / Cologne  
Germany  
Telephone: 0221 470 7050  
Fax: 0221 470 4917  
Email: [f.kraas@unikoeln.de](mailto:f.kraas@unikoeln.de)  
www: [www.geographie.unikoeln.de](http://www.geographie.unikoeln.de)

Eberhard Krain  
Fahrenheitstr. 6  
28359 Bremen  
Germany  
Telephone: 494212380045  
Fax: 494212380030  
Email: [eberhard.krain@zmtbremen.de](mailto:eberhard.krain@zmtbremen.de)  
www: [www.zmtbremen.de](http://www.zmtbremen.de)

Dr. Gesche Krause  
Center for Tropical Marine Ecology  
Fahrenheitstr. 6  
28359 Bremen  
Germany  
Telephone: 49 0421 238 00 28  
Fax: 49 0421 238 00 30  
Email: [gesche.krause@zmtbremen.de](mailto:gesche.krause@zmtbremen.de)  
www: [www.zmtbremen.de](http://www.zmtbremen.de)

Dr Hartwig Kremer  
Executive Officer LOICZ  
NIOZ  
P.O. Box 59, 1790 AB  
Den Burg, Texel  
Netherlands  
Phone: +31-(0)222-369404  
Fax: +31-(0)222-369430  
Email: kremer@nioz.nl

Dr. R. Krishnamurthy  
Department of Applied Geology  
School of Earth Atmospheric Sciences  
University of Madras  
Guindy Campus, Post Bag 5327  
Chennai 600025, India  
Telephone: 00914422531786  
Fax: 00914422352870  
Email: rkrishnamurthy@gmail.com  
www:  
<http://www.unom.ac.in/guifackrishnamo.html>

M. Dileep Kumar  
Chemical Oceanography Division  
National Institute of Oceanography  
Dona Paula, Goa 403 004, India  
Telephone: 918322450450 extn. 398  
Fax: 918322450602  
Email: dileep@darya.nio.org  
www: Nio.org

Prof. Dr. Remi Laane  
P.O.Box 20907  
2500 EX The Hague  
The Netherlands  
Telephone: 0031703114293  
Fax:  
Email:  
[r.w.p.m.lane@rikz.rws.minvenw.nl](mailto:r.w.p.m.lane@rikz.rws.minvenw.nl)  
www: RIKZ.nl

Dr Yadh Labane  
106 Avenue de Jugurtha,  
Mutuelleville, 1002 Tunis, Tunisie  
Telephone: W 00 216 71 773 400 ext  
1008, M 00 216 97 409 659  
Email: Labbene@meteo.tn

Christoph Lampert  
Karlsplatz 13  
1040 Vienna  
Austria  
Telephone: 43 1 5880122614  
Fax: 43 1 5880122699  
Email: clampert@iwag.tuwien.ac.at  
www: [www.iwag.tuwien.ac.at](http://www.iwag.tuwien.ac.at)

Prof. Felino P. Lansigan  
Institute of Statistics INSTAT, and The  
School of Environmental Science and  
Management SESAM  
University of the Philippines Los Baos  
UPLB  
College, Laguna 4031 Philippines  
Telephone: 63495362381  
Fax: 63495362381  
Email: fpl@instat.uplb.edu.ph or  
[fpplansigan@yahoo.com](mailto:fpplansigan@yahoo.com)  
www: [www.uplb.edu.ph](http://www.uplb.edu.ph)

Goulven G. Laruelle  
Department of Earth Sciences  
Geochemistry  
Utrecht University Faculty of  
Geosciences  
P.O. Box 80.021  
3508 TA Utrecht  
The Netherlands  
Telephone: 31 30 253.3264  
Fax: 31 30 253.5302  
Email: [g.laruelle@geo.uu.nl](mailto:g.laruelle@geo.uu.nl)



Ms. Jennifer Laughlin  
UNEP Regional Seas Programme  
Kortenaekade 1  
2518 AX The Hague  
The Netherlands  
Telephone: +31 70 311 4478  
Fax: +31 70 345 6648  
Email: j.laughlin@unep.nl

Gregor Laumann  
International Human Dimensions  
Programme on Global Environmental  
Change IHDP  
WalterFlexStr. 3  
53113 Bonn  
Germany  
Telephone: 49 228 73 49 56  
Fax: 49 228 73 90 54  
Email: Laumann.ihdp@unibonn.de  
www: www.ihdp.org

Martin Le Tissier  
P.O. Box 59  
1790 AB, Den Burg, Texel  
The Netherlands  
Telephone: 310222369404/403  
Fax: 310222369430  
Email: tissier@nioz.nl  
www: www.loicz.org

Carlos H. Lechuga Deveze  
Mar Bermejo 195  
La Paz, Baja California Sur  
Mexico  
Telephone: 52 612 123 84 23  
Fax: 52 612 125 47 10  
Email: clechuga@cibnor.mx  
www: <http://www.cibnor.mx>

Peter Lengyel  
Calea Plevnei 61, Bucharest, Romania  
Home address:  
Peter Lengyel, Sighetu Marmatiei,  
cartier 1 Mai, 7/11,  
Maramures, Romania  
Telephone: 40722 459 119  
Fax: 4021 311 26 44  
Email: lengyelpeter@yahoo.com Cc:  
pronatura@ccs.ro  
www: www.pronatura.ro

Katharina Licht  
Research Technology Centre  
Westcoast  
Hafentn 1  
25761 Bsum  
Germany  
Telephone: 49 04834 / 604215  
Fax: 49 04834 / 604299  
Email: licht@ftzwest.unikiel.de  
www: www.coastalfutures.de

Han Lindeboom  
Postbox 167  
1790 AD Den Burg  
The Netherlands  
Telephone: 31 0222369738  
Fax: 31 0222319235  
Email: Han.lindeboom@wur.nl

Ms. Iozefina Lipan  
UNDP-GEF Black Sea Ecosystem  
Recovery Project  
Project Implementation Unit  
Dolmabahce Sarayi, II. Hareket Kosku  
80680 Besiktas  
Istanbul  
Turkey  
Telephone: +90.212.310 29 26  
(direct), +90.212.310 29 27  
+90.212.227 99 33  
Email: [jlipan@blacksea-environment.org](mailto:jlipan@blacksea-environment.org)

Dr. Su Mei Liu  
College of Chemistry and Chemical  
Engineering  
Ocean University of China  
5 Yushan Road, Qingdao, 266003  
P. R. China  
Telephone: 8653282032005  
Fax: 8653282033005  
Email: [sumeiliu@mail.ouc.edu.cn](mailto:sumeiliu@mail.ouc.edu.cn)

KK Liu  
Institute of Hydrological Sciences  
National Central University  
Jhongli, Taoyuan 32001  
Taiwan, Rep. of China  
Telephone: 88634223354  
Fax: 88634222894  
Email: [kkliu@cc.ncu.edu.tw](mailto:kkliu@cc.ncu.edu.tw)  
www: [www.ncu.edu.tw/kkliu/](http://www.ncu.edu.tw/kkliu/)

Jose Lucas Perez Llorens  
Departamento de Ecologia  
Facultad de Ciencias del Mar y  
Ambientales  
Universidad de Cdiz  
Apartado, num. 40  
11510 Puerto Real  
Cadiz  
Spain  
Telephone: 34956016026  
Fax: 34956016019  
Email: [joselucas.perez@uca.es](mailto:joselucas.perez@uca.es)  
www:  
<http://www2.uca.es/grupinvest/ecosista-cuaticos/componentes/PersonalEDEA/JLPLMainesp.htm>

N Loeser  
Email: [nardine.loeser@io-warnemuende.de](mailto:nardine.loeser@io-warnemuende.de)

Dr. Vitaly Lystsov  
Russian Research Centre  
Kurchatov Institute  
Ploshchad' akademika Kurchatova 46,  
123182 Moscow, Russia  
Telephone: +7 095 196 6328 (Hse)  
Email: [vitalil@pike.pike.ru](mailto:vitalil@pike.pike.ru)

Stefanie Maack  
Email: [maack@euccd.de](mailto:maack@euccd.de)  
www: [www.euccd.de](http://www.euccd.de)

Xavier Durrieu de Madron  
CEFREM  
CNRS University of Perpignan  
52 Avenue Paul Alduy  
66860 Perpignan cedex France  
Telephone: 33 4 68 66 22 48  
Fax: 33 4 68 66 20 96  
Email: [demadron@univperp.fr](mailto:demadron@univperp.fr)  
www: <http://www.univperp.fr/cefrem/>

Marcel Marchand  
P.o. Box 177  
2600 MH Delft  
The Netherlands  
Telephone: 31 15 285 8558  
Fax: 31 15 285 8710  
Email: marcel.marchand@wldelft.nl  
www: www.wldelft.nl

Jose Mariscal Romero  
Gomez Farias 86  
San PatricioMelaque, Jalisco  
CP 48980 Mxico  
Telephone: 315 355 63 30  
Fax: 315 355 63 31  
Email:  
mariscal@costera.melaque.udg.mx  
www: <http://costera.melaque.udg.mx>

Dr. Marcia Marques  
Rio de Janeiro State University UERJ  
Rua São Francisco Xavier, 524,  
CEP 20559-900 Maracanã, Rio de  
Janeiro, RJ, Brazil  
Telephone: +55 21 8124 2382  
Email: marcia@marques.pro.br

Bruce A. Maxwell  
500 College Ave  
Swarthmore College  
Swarthmore, PA 19081 USA  
Telephone: 6103288081  
Email: maxwell@swarthmore.edu  
www: <http://palantir.swarthmore.edu>

Michael McClain  
Department of Environmental Studies  
Florida International University  
Miami, Florida 33199 USA  
Telephone: 13053486826  
Fax: 13053486137  
Email: michael.mcclain@fiu.edu

www: <http://www.fiu.edu/mcclainm>

William J. McConnell  
Land Use and Cover Change Project  
Indiana University, SB 331  
Bloomington, IN 47405-7100  
Telephone: +1 (812) 856-5320  
Fax: +1 (812) 855-3000  
Email: wjmconn@indiana.edu

Dr Loraine McFadden  
Flood Hazard Research Centre Enfield  
Middlesex  
United Kingdom  
Email: L.McFadden@mdx.ac.uk

Prof Roger McLean  
School of Physical, Environmental and  
Mathematical Sciences  
UNSW @ ADFA  
Canberra, ACT 2600  
Australia  
Telephone: +61 2 62688311  
Fax: +61 2 62688017  
Email: r.mclean@adfa.edu.au

Prof. Laurence Mee  
Professor of Marine and Coastal Policy  
Associate Head (Research)  
School of Earth, Ocean and  
Environmental Sciences  
University of Plymouth  
United Kingdom  
Telephone: +44-1752 233719  
Fax: +44-1752 233039  
E-mail: [lmee@plymouth.ac.uk](mailto:lmee@plymouth.ac.uk)  
[www.ims.plym.ac.uk/marine-policy](http://www.ims.plym.ac.uk/marine-policy)

Msc. Ursula Mendoza  
Center for Marine Tropical Ecology  
Fahrenheitstrasse 6  
28359 Bremen  
Germany  
Telephone: 49 421 2380063  
Fax: 49 421 2380050  
Email:  
ursula.mendoza@zmtbremen.de  
www: www.zmtbremen.de

Liana Talaue McManus  
Division of Marine Affairs Policy  
University of Miami Rosenstiel School  
of Marine  
Atmospheric Science  
4600 Rickenbacker Causeway, Miami,  
FL 33149 USA  
Telephone: 1 305 421 4760; 4085  
Fax: 1 305 421 4675  
Email: lmcmanus@rsmas.miami.edu

Adelina Mensah  
Department of Oceanography  
Fisheries  
Box LG 99, Legon  
University of Ghana  
Accra, Ghana  
Telephone: 233 244 481018  
Fax: 233 21 507147  
Email: ammensah@ug.edu.gh

Michel Meybeck  
Sisyphé  
University Paris 6  
Place Jussieu  
75252 Paris Cedex 05 France  
Telephone:  
Fax: 33 1 44 27 51 25  
Email: meybeck@ccr.jussieu.fr

Tanja Michler  
Alfred Wegener Institute for Polar and  
Marine Research AWI  
Am Handelshafen 12  
D27570 Bremerhaven  
Germany  
Telephone: 24047148311949  
Fax: 49047148311425  
Email: tmichler@awibremerhaven.de  
www:  
<http://www.awibremerhaven.de/People/showtmichler>

Jack Middelburg  
Netherlands Institute of Ecology  
NIOOKNAW  
Centre for Estuarine and Marine  
Ecology  
Korringaweg 7  
4401 NT Yerseke, The Netherlands  
Telephone: 31113557476  
Fax: 31113573616  
Email: j.middelburg@nioo.knaw.nl  
www:  
<http://www.nioo.knaw.nl/PPAGES/jmiddelburg/index.htm>

Mrio MilHomens  
INETI  
Departamento de Geologia Marinha  
Estrada da Portela, Zambujal  
Apartado 7586, 2721866  
ALFRAGIDE  
PORTUGAL  
Telephone: 351214705446  
Fax: 351214719018  
Email: mario.milhomens@ineti.pt  
www:  
<http://www.igm.ineti.pt/departam/gmarinha/default.htm>

John Milliman  
Virginia Institute of Marine Science  
P.O. Box 1346  
Gloucester Point  
Virginia 23062-1346  
USA  
Telephone: +1 (804) 684-7112  
Email: milliman@vims.edu

Dr David Milton  
CSIRO Marine and Atmospheric  
Research,  
PO Box 120,  
Cleveland 4163 QLD  
AUSTRALIA  
Telephone: 61 7 3826 7241  
Fax: 61 7 3826 7222  
Email: david.milton@csiro.au

Pedro M. S. Monteiro  
CSIR, PO Box 320  
Stellenbosch  
South Africa  
Email: pmonteir@csir.co.za

João Morais  
Deputy Director  
IGBP Secretariat  
Royal Swedish Academy of Sciences  
Box 50005  
S-104 05 Stockholm  
Sweden  
Tel: +46-8-16-64-48  
Fax: +46-8-16-64-05  
Email: morais@igbp.kva.se

Olga Morozova  
38 Bering street, 199397,  
SaintPetersburg,  
Telephone: 7 812 352 23 21  
Fax: 7 812 352 26 88  
Email: mozolya@mail.ru

Barbaro V. Moya  
La Habana  
Cuba  
Email: barbaromoya@yahoo.com

Dr. Nicholas Murray  
06000 Nice,  
France  
Telephone: 0039493819105  
Email: nicholasmurray@lycos.com

Rosemarie Mwaipopo  
University of Dar es Salaam  
Department of  
Sociology/Anthropology  
PO Box 35043  
Dar es Salaam  
TANZANIA  
Telephone: (255) 0744-849458  
Email: Ny\_lila@yahoo.com

Dr. K. Narayanan  
Department of Humanities Social  
Sciences  
Indian Institute of Technology  
Bombay  
Powai, Mumbai 400076  
India  
Telephone: 912225767381  
Fax: 912225723480  
Email: knn@hss.iitb.ac.in  
www: hss.iitb.ac.in

Alice Newton  
IMAR  
FCTGambelas Campus  
Universidade do Algarve  
8005139 Faro  
Portugal  
Telephone: 351 91 911 00 26  
Fax: 351 289 819 403  
Email: Anewton@ualg.pt  
www: <http://w3.ualg.pt/anewton/>

Nguyen Thi Tram Anh  
Nha Trang University of Fisheries  
16 Ho Xuan Huong street  
Nha Trang city  
Khanh Hoa province  
Vietnam  
Email: [tramanhdhts@yahoo.com](mailto:tramanhdhts@yahoo.com)

Prof. Robert Nicholls  
School of Civil Engineering and the  
Environment and the Tyndall Centre,  
University of Southampton  
Southampton SO17 1BJ UK  
Telephone: 442380594139  
Fax: 442380677519  
Email: [r.j.nicholls@soton.ac.uk](mailto:r.j.nicholls@soton.ac.uk)

Dr. Miroslav Nitishinsky  
38 Bering str.  
St. Petersburg  
Russia, 199397  
Telephone: 79216346290  
Fax: 78123522688  
Email: [MNitishinsky@mail.ru](mailto:MNitishinsky@mail.ru)  
www: [www.aari.nw.ru](http://www.aari.nw.ru)

Luci Hidalgo Nunes  
Instituto de Geociencias UNICAMP  
CP 6152  
Campinas, SP  
Brasil  
Telephone: 5519 37884573  
Fax: 5519 32891097  
Email: [luci@ige.unicamp.br](mailto:luci@ige.unicamp.br)  
www: [ige.unicamp.br](http://ige.unicamp.br) Departamento  
de Geografia

Corinna Nunneri  
FTZ Büsum  
Hafentörn 1  
D-25761 Büsum  
Germany  
Email: [nunneri@ftz-west.uni-kiel.de](mailto:nunneri@ftz-west.uni-kiel.de)

Ochieng Ogodo,  
Biosafety News,  
Box 9868,  
00100Mairobi Kenya  
Telephone: 254 722 36 94 48  
Email: [ogodo16@hotmail.com](mailto:ogodo16@hotmail.com)  
www: [biosafetynews.com](http://biosafetynews.com)

Prof. Stephen Olsen  
Director, Coastal Resources Center  
Graduate School of Oceanography  
University of Rhode Island,  
NarragansettBay Campus  
Narragansett, RI 02882, USA  
Telephone: (401) 874-6224  
Fax: (401) 789-4670  
E-mail: [olsenuri@gso.uri.edu](mailto:olsenuri@gso.uri.edu)

Dr Melckzedek K. Osore  
Western Indian Ocean Marine Science  
Association  
P. O. Box 3298  
Zanzibar - Tanzania  
+255 24 2233472  
+255 24 2233852  
mosore@wiomsa.org  
www.wiomsa.org

Dr. Winfried Osthorst  
University of Bremen, Research Centre  
Sustainability  
EnriqueSchmidtStrae 7 SFG  
D28359 Bremen  
Telephone: 49421535729  
Email: Osthorst@arcor.de  
www: www.artec.unibremen.de

Dr Elena Ostrovskaya  
Caspian Marine Scientific and  
Research Center  
Ulitsa Shiryayeva, 14  
414045, Astrakhan  
Russia  
Telephone: 7 8512 303440  
Fax: 7 8512 301163  
Email: eostrovskaya@mail.ru,  
kaspnmiz@astranet.ru  
www: <http://caspiannonitoring.ru>

Jozef M. Pacyna  
P.O.Box 100  
2027 Kjeller  
2028 Norway  
Telephone: 47 63898155  
Fax: 47 63898050  
Email: jp@nilu.no  
www: www.nilu.no

John Parslow  
CSIRO Marine and Atmospheric  
Research  
GPO Box 1538  
Hobart 7001  
Tasmania, Australia.  
Telephone: 61 3 62 325202  
Fax: 61 3 62 325123  
Email: john.parslow@csiro.au  
www: <http://www.marine.csiro.au/>

Ms Maike Paul  
Ulenloch 6  
37124 Rosdorf  
Germany  
Telephone: 4917627 15 47 51  
Email: maikepaul@web.de

Gerardo M. E. Perillo  
CC 804  
B8000FWB Baha Blanca  
Argentina  
Telephone: 542914861112/1519  
Fax: 542914861112/1519  
Email: perillo@criba.edu.ar  
www: [iado.criba.edu.ar](http://iado.criba.edu.ar)

Renzo Perissinotto  
School of Biological Conservation  
Sciences  
University of KwaZuluNatal  
Howard College Campus, G. Campbell  
Building  
Durban 4041  
Telephone: 27 031 2601194  
Fax: 27 031 2602029  
Email: perissinottor@ukzn.ac.za

Alan Pickaver  
EUCC  
Kustvereniging (EUCC)  
Postbus 11232  
2301 EE Leiden  
Telephone: 071-5122900  
Fax: 071-5124069  
Email: a.pickaver@eucc.net

Tipparat Pongthanapanich  
Department of Environmental and  
Business Economics  
Centre for Fisheries Aquaculture  
Management Economics FAME  
University of Southern Denmark SDU  
Niels Bohrs Vej 9, DK6700 Esbjerg,  
Denmark  
Telephone: 45 65504151  
Fax: 4565501091  
Email: tpo@sam.sdu.dk

Catherine Poulton  
British Geological Survey  
Kingsley Dunham Centre  
Keyworth  
Nottingham  
NG12 5GG  
UK  
Telephone: 0115 936 3049  
Fax: 0115 936 3460  
Email: cpoulton@bgs.ac.uk  
www: www.bgs.ac.uk

M. Bala Krishna Prasad  
School of Environmental Sciences  
Jawaharlal Nehru University  
New Delhi 110 067, India  
Telephone: 911126704314  
Email: prasambk@yahoo.co.in

Ricardo Prego  
Instituto de Investigaciones Marinas  
CSIC  
Eduardo Cabello, 6  
36208 Vigo  
Spain  
Telephone: 34 986 231 930 ext. 140  
Fax: 34 986 292 762  
Email: prego@iim.csic.es  
www: <http://www.iim.csic.es/>

Theo Prins  
PO Box 8039  
4330 EA Middelburg  
The Netherlands  
Telephone: 31 118 672285  
Fax: 31 118 651046  
Email: t.prins@rikz.rws.minvenw.nl  
www: [www.rikz.nl](http://www.rikz.nl)

Nancy Rabalais  
Louisiana Universities Marine  
Consortium  
8124 Hwy. 56  
Chauvin, LA 70344 USA  
Telephone: 9858512836  
Fax: 9858512874  
Email: nrabalais@lumcon.edu  
www: [www.lumcon.edu](http://www.lumcon.edu)

Dr. Christophe Rabouille  
Laboratoire des Sciences du Climat et  
de l'Environnement  
Unit Mixte de Recherche CNRSCEA  
Domaine du CNRS Bat 12  
Avenue de la Terrasse  
F91198 Gif-sur-Yvette France  
Telephone: Tel:33169.82.35.30  
Fax: Fax:33169.82.35.68  
Email: rabouill@lsce.cnrs.gif.fr



Volker Rachold  
Alfred Wegener Institute, Research  
Unit Potsdam  
Telegrafenberg A43  
14473 Potsdam  
Germany  
Telephone: 493312882174  
Fax: 493312882137  
Email: vrachold@awipotsdam.de  
www: www.awipotsdam.de/acd

Olivier Radakovitch  
CEREGE  
Europole de l arbois BP 80  
13545 Aix en Provence France  
Telephone: 4 42 97 15 80  
Fax: 4 42 97 15 95  
Email: radakovitch@cerege.fr  
www: Cerege.fr

Tim Radford  
The Guardian,  
119 Farringdon Road,  
London EC1R 3ER  
Telephone: +44 (0)207 239 9604  
Fax: +44 (0)207 713 4154  
Email: Tim.radford@guardian.co.uk

Ivonne M. Radjawane  
Oceanographic Program Study  
Department of Geophysics and  
Meteorology  
Bandung Institute of Technology  
LabTek XI, 1st floor  
Jalan Ganesha 10  
Bandung 40132  
Indonesia  
Telephone: 62222505253  
Fax: 62222534139  
Email: ivonnemr@geoph.itb.ac.id

Dr. M. Rafiqul Islam  
Team Leader  
Program Development Office,  
Integrated Coastal Zone Management  
Road 22, House 4/A, Gulshan 1,  
Dhaka 1212, BANGLADESH  
Telephone: 8802 989 2787  
Fax: 8802 882 6614  
Email: rafiq@iczmpbd.org  
www: www.iczmpbangladesh.org

Dr. A. Atiq Rahman  
Executive Director  
Bangladesh Centre for Advanced  
Studies BCAS  
House No. 10, Road No. 16A, Gulshan  
1  
Dhaka 1212, Bangladesh  
Telephone: Dir: 8802 8858049  
PABX: 8802 8851237, 8851986,  
8852217, 8852904  
Ext. 109 101  
Fax: 8802 8851417  
Email: atiq.rahman@bcas.net  
www: www.bcas.net

R. Ramesh  
Institute for Ocean Management  
Anna University  
Chennai 600 025  
India  
Email: rramesh\_au@hotmail.com

John Rapaglia  
195 Endeavour Hall  
Marine Sciences Research Center  
SUNY Stony Brook  
Stony Brook, NY 11794, USA  
Telephone: 001 631 632 3704  
Email: jrapagli@ic.sunysb.edu

Arturas Razinkovas  
Coastal Research Planning Institute  
Klaipeda University  
Manto 84, Klaipeda  
Lithuania  
Telephone: 370 46 398844  
Fax: 370 46 398845  
Email: art@corpi.ku.lt  
www: www.corpi.ku.lt

Luis Rebêlo  
INETI  
Departamento de Geologia Marinha  
Estrada da Portela, Zambujal  
Apartado 7586  
2721-866 Alfragide  
Portugal  
Telephone: 351-21-4705533  
Fax: 351-21-4719018  
Email: luis.rebelo@ineta.pt  
www:  
<http://www.igm.ineta.pt/departam/gmarinha/default.htm>

Juan Restrepo  
EAFIT University  
AA 3300, Medelln, Colombia  
Telephone: 5742619329  
Fax: 5742664284  
Email: jdrestre@eafit.edu.co  
www: www.eafit.edu.co

Catherine Rigg  
P.O. Box 34  
Tlell, BC  
V0T 1Y0  
Telephone: 250 5578515  
Email: crigg@sfu.ca

Mr. Alejandro Robles  
Executive President  
Noroeste Sustentable  
11348 Vista Sorrento Parkway, # K-206  
San Diego, CA 92130 USA  
Email: a.robles@conservation.org

Associate Professor Eva Roth  
University of Southern Denmark  
Niels Bohrsvej 9  
DK6700 Esbjerg  
Denmark  
Telephone: 45 65 50 41 86 Direct  
Fax: 45 65 50 10 91  
Email: er@sam.sdu.dk  
www: <http://www.sam.sdu.dk/ansat/er>

Peter C Rothlisberg  
CSIRO Cleveland Laboratories  
PO Box 120  
Cleveland, Qld 4163  
Australia  
Telephone: 61 7 3826 7225  
Email: peter.rothlisberg@csiro.au

Nicoletta Ruggieri  
Dipartimento per lo Studio del  
Territorio e delle sue Risorse  
DIP.TE.RIS. Universit degli Studi di  
Genova, C.Europa  
26, Genova, Italy  
Telephone: 00390103538583  
Fax: 00390103538140  
Email: ruggieri@dipteris.unige.it

Prof. Jrgen Rulloeketter  
Institute of Chemistry and Biology of  
the Marine Environment  
ICBM  
Carl von Ossietzky University of  
Oldenburg  
P.O. Box 2503  
D26111 Oldenburg  
Germany  
Telephone: 49 441 7985359  
Fax: 49 441 7983404  
Email: j.rullkoetter@icbm.de  
www: www.icbm.de/ogc

Ms Susanne Rupp  
School of Civil Engineering and the  
Environment  
University of Southampton  
Highfield  
Southampton  
SO17 1BJ  
United Kingdom  
Telephone: 044 2380593713  
Email: sgr@soton.ac.uk

Dr. Renison Ruwa  
Kenya Marine and Fisheries Research  
Institute  
P.O Box 81651, Mombasa  
Telephone: +254 733 700 572  
Fax: +254 41 475 157  
Email: kruwa@kmfri.co.ke

Letizia Sabetta  
Department of Biological and  
Environmental Sciences and  
Technologies  
University of Lecce  
Ecotekne, SP Lecce Monteroni, 73100  
Lecce  
Telephone: 39 832 298606  
Fax: 39 832 298722  
Email: letizia.sabetta@unile.it

Jeff Safran  
National Geophysical Data Center  
325 Broadway E/GC2  
Boulder, Colorado 80305  
USA  
Telephone: 303 4976603  
Fax: 303 4976513  
Email: jeff.safran@noaa.gov  
www: <http://dmsp.ngdc.noaa.gov>  
Yoshiki Saito  
Central 7, Higashi 111, Tsukuba,  
Ibaraki 3058567, Japan  
Telephone: 81298613895  
Fax: 81298613747  
Email: Yoshiki.saito@aist.go.jp  
www:  
<http://staff.aist.go.jp/yoshiki.saito/>

Joe Salisbury  
University of New Hampshire  
211 Morse Hall  
Durham, NH USA 03824  
Telephone: 6038620849  
Email: joe.salisbury@unh.edu

W. Salomons  
Free University Amsterdam  
Institute for Environmental Studies  
Amsterdam  
the Netherlands  
Email: wim.salomons@home.nl

Dr. Jayampathy Samarakoon  
Central Environmental Authority  
104 Robert Gunawardena Mawatha  
Battaramulla, Sri Lanka  
Telephone: +94 11 287 2300  
Fax: +94 11 287 2300  
Email: samarakoon@eureka.lk

M. G. Sarwar  
LUMES  
Lund University  
PO Box 170  
SE 221 00 LUND  
Sweden  
Telephone: 46 46 222 0470  
Fax: 46 46 222 0475  
Email: sarwaredu@yahoo.co.in  
www: <http://www.lumes.lu.se>

Dr. Anja Scheffers  
Email: [Anja.Scheffers@uniessen.de](mailto:Anja.Scheffers@uniessen.de)

Sybil Seitzinger  
Rutgers University  
Institute of Marine and Coastal  
Sciences  
71 Dudley Rd  
New Brunswick, NJ 08901 USA  
Telephone: 17329326555 x342  
Fax: 17329321792  
Email: [Sybil@marine.rutgers.edu](mailto:Sybil@marine.rutgers.edu)  
www:  
[www.marine.rutgers.edu/BGC/home.htm](http://www.marine.rutgers.edu/BGC/home.htm)

Agnieszka Sekscinska  
Social Science Research Center Berlin  
WZB  
Reichpietschufer 50, D10785 Berlin  
Germany  
Telephone: 49 30 25491 267  
Fax: 49 30 25491 219  
Email: [sekscinska@wzberlin.de](mailto:sekscinska@wzberlin.de)  
www: [wzberlin.de](http://wzberlin.de); [ikzmoder.de](http://ikzmoder.de)

Yohanna W. Shaghude  
Institute of Marine Sciences  
P.O. Box 668  
Zanzibar  
Email: [shaghude@ims.udsm.ac.tz](mailto:shaghude@ims.udsm.ac.tz)

Prof. Sayed Hassan Sharaf El din  
Oceanography Department  
Faculty of Science  
Alexandria University , Alex . EGYPT  
.  
Telephone: 002035432704  
Fax: 002035435956  
Email: [ecosalex@yahoo.com](mailto:ecosalex@yahoo.com)  
www: [www.AJLO.com](http://www.AJLO.com)

Dr Keshav Prasad Sharma  
Department of Hydrology and  
Meteorology  
Babarmahal  
PO Box 406, Kathmandu, Nepal  
Telephone: 97714248808  
Fax: 97714262348  
Email: [kpspoudel@yahoo.com](mailto:kpspoudel@yahoo.com)  
www: [www.geocities.com/kpspoudel/](http://www.geocities.com/kpspoudel/)

E. Shumilin  
CICIMAR-IPN  
Av. IPN s/n , Col. Playa Palo de Santa  
Rita  
Apdo. Postal 592  
La Paz, Baja California Sur, 23096  
Mexico  
Email: [eshumili@ipn.mx](mailto:eshumili@ipn.mx)

Jaap S. Sinninghe Damst  
Royal NIOZ  
PO Box 59  
1790 AB Den Burg  
The Netherlands  
Telephone: 31222369550  
Fax: 31222319674  
Email: damste@nioz.nl  
www:  
<http://www.nioz.nl/nioznl/2384a08d599a5b4c78929309e5b38f7a.php>

Dr. Caroline P. Slomp  
Department of Earth Sciences  
Geochemistry  
Faculty of Geosciences, Utrecht  
University  
Budapestlaan 4, 3584 CD Utrecht, the  
Netherlands  
Telephone: 310302535514  
Fax: 310302535302  
Email: slomp@geo.uu.nl  
www:  
<http://www.geo.uu.nl/Research/Geochemistry/CSlomp.html>

Maria Snoussi  
University Mohamed V, Faculty of  
Sciences  
Department of Earth Sciences  
Avenue Ibn Battouta, B.P. 1014  
Rabat, Morocco  
Telephone: 212 37 771957  
Fax: 212 37 771957  
Email: masnoussi@yahoo.fr  
snoussi@fsrac.ma  
www: [www.fsrac.ma](http://www.fsrac.ma)

Dr Milika Naqasima-Sobey  
Marine Studies Programme  
University of the South Pacific  
PO Box 1168  
Suva  
FIJI  
Telephone: (679) 323 2947  
Fax: (679) 3231513  
Email: sobey\_m@usp.ac.fj

Cosimo Solidoro  
Email: csolidoro@inogs.it

Federico Spagnoli  
ISMARCNR, Via Pola, 4  
71010 Lesina  
Italy  
Telephone: 390882992702  
Fax: 390882991352  
Email:  
Federico.spagnoli@fg.ismar.cnr.it

Mark Spalding  
93 Centre Drive  
Newmarket  
CB8 8AW  
UK  
Telephone: 44 1638 661961  
Email: mspalding@tnc.org  
www: [nature.org](http://nature.org)

Dr. Joanna Staneva  
Junior Research Group IMPULSE  
ICBM University of Oldenburg  
P.B. 2503 26111 Oldenburg Germany  
Telephone: 494417983635  
Fax: 494417983404  
Email: jstaneva@icbm.de  
www: <http://www.icbm.de/impulse>

John Stanturf  
Southern Research Station  
320 Green St.  
Athens, GA 30602  
Telephone: 001 706 559 4316  
Fax: 001 706 559 4317  
Email: Drdirtms@yahoo.com,  
jstanturf@fs.fed.us  
www:  
www.srs.fs.usda.gov/disturbance

R. Stevens  
Department of Earth Sciences  
Göteborg University  
Box 460  
40530 Göteborg  
Sweden  
Email: stevens@geo.gu.se

Dennis Swaney  
Dept of Ecology Evolutionary Biology  
Corson Hall  
Cornell University  
Ithaca, NY 14853 USA  
Telephone: 16072553572  
Email: dps1@cornell.edu

James P.M. Syvitski  
Environmental Computation and  
Imaging Facility  
INSTAAR  
University of Colorado  
Boulder CO, 80309-0450  
USA  
Email: james.Syvitski@colorado.edu

Prof. Claudio Szlafsztain  
Department of Geology, Center of  
Geosciences,  
University Federal of Par.  
Campus Universitário do Guam,  
66075110, BelmPA, Brazil.  
Telephone: 559131831426  
Fax: 559132303915  
Email: iosele@ufpa.br

Susan Taljaard  
CSIR  
P O Box 320  
Stellenbosch, 7599  
South Africa  
Telephone: 27 21 8882494  
Fax: 27 21 8882693  
Email: staljaard@csir.co.za  
www: www.csir.co.za

Frank Thomalla  
Stockholm Environment Institute  
Lilla Nygatan 1, Box 2142  
103 14 Stockholm  
Sweden  
Email: frank.thomalla@sei.se

Helmuth Thomas  
Dalhousie University  
Department of Oceanography  
1355 Oxford Street  
Halifax, Nova Scotia  
Canada, B3H 4J1  
Telephone: 19024947177  
Fax: 19024943877  
Email: helmuth.thomas@dal.ca  
www:  
<http://oceanography.dal.ca/oceanC2634.html>

Prof Kerry Turner  
CSERGE  
School of Environmental Sciences  
University of East Anglia  
Norwich  
UK  
Telephone: 44 0 1603 592551  
Fax: 44 0 1603 593739  
Email: r.k.turner@uea.ac.uk  
www:  
<http://www.uea.ac.uk/env/cserge/>

Dr Nossos Vafeidis  
Geography Building, Ground floor  
University of the Aegean  
University Hill  
Mytilene 81100  
Greece  
Telephone: 00493048495506  
Email: a.vafeidis@ieee.org

AJ Vander Woude  
University of California, Santa Cruz  
A316 EMS Ocean Sciences  
1156 High Street  
Santa Cruz, CA 95060  
Telephone: 8312399685  
Email: andrea@pmc.ucsc.edu  
www: <http://es.ucsc.edu/andrea>

Dr Christopher Vane  
British Geological Survey,  
Keyworth, Nottingham  
NG12 5GG  
Telephone: 44 0115 936 3017  
Fax: 44 0115 3460  
Email: chv@bgs.ac.uk  
www: [Bgs.ac.uk](http://Bgs.ac.uk)

Jan Vermaat  
IVM  
De Boelelaan 1087  
1081 HV Amsterdam  
The Netherlands  
Telephone: 31 20 598 9596  
Fax: 31 20 598 9553  
Email: Jan.vermaat@ivm.falw.vu.nl  
www: [www.vu.nl/ivm](http://www.vu.nl/ivm)

Pierluigi Viaroli  
Parco Area delle Scienze 33  
43100 Parma, Italy  
Telephone: 39.0521.905683  
Fax: 39.0521.905402  
Email: pierluigi.viaroli@unipr.it

Susana Beatriz Vinzon  
Cx Po 68508, Centro de Tecnologia  
C203  
21945970, Rio de Janeiro, RJ  
Brazil  
Telephone: 55 21 2562 8748  
Fax: 55 21 2562 8748  
Email: susana@peno.coppe.ufrj.br

Kelly Vodden  
PO Box 214  
Centreville, NL  
Canada  
A0G 4P0  
Telephone: 7096787463  
Email: kmvodden@sfu.ca

A. Vorlauf  
EUCC-The Coastal Union Germany  
Poststr. 6, 18119 Rostock-  
Warnemünde  
Germany  
Email: [anke.vorlauf@web.de](mailto:anke.vorlauf@web.de)

Neelanga Weragala  
International Water Management  
Institute IWMI  
P.O. Box 2075  
Colombo  
Sri Lanka  
Telephone: 94 112 787404  
Fax: 94 112 786854  
Email: n.weragala@cgiar.org  
www: www.iwmi.org

Hester Whyte  
P.O. Box 59  
1790 AB Den Burg, Texel  
The Netherlands  
Telephone: 310222369404  
Fax: 3100222369430  
Email: loicz@nioz.nl  
www: www.loicz.org

Nalin Wikramanayake  
Dept. of Civil Engineering  
Open University of Sri Lanka  
Nawala, Nugegoda  
Sri Lanka  
Telephone: 94112853777 ext. 472,  
94777763123  
Fax: 94112436858  
Email: tomwiks@yahoo.com

Wilhelm Windhorst  
kologieZentrum der Universitt Kiel  
Olshausenstr.75  
24118 Kiel  
Telephone: 49 431 880 4386  
Fax: 40 431 880 4083  
Email:  
Wwindhorst@ecology.unikiel.de  
www: Ecology.unikiel.de

E. Wolanski  
Australian Institute of Marine Science  
PMB No. 3  
Townsville MC  
Q. 4810  
Australia  
Email: e.wolanski@aimes.gov.au

Dr Maureen Woodrow  
Dept. of Geography and  
Environmental Studies  
Carleton University, Loeb B349  
1125 Colonel By Drive  
Ottawa, CANADA  
K1S 5B9  
Telephone: 6135202600 ex 1984  
Fax: 6135204301  
Email: Mwoodrow@ccs.carleton.ca  
www:gechs.org

Dr. Xuegong Xu  
Department of Resources and  
Environmental Geosciences  
Peking University  
Beijing 100871  
China  
Telephone: 861062767240  
Fax: 861062751187  
Email: xxg@urban,pku.edu.cn

Dr. Masumi Yamamuro  
Institute of Geology and  
Geoinformation,  
Geological Survey of Japan, AIST.  
Tsukuba Central 7 Tsukuba 3058567  
Japan  
Telephone: 81298613766  
Fax: 81298613766  
Email: myamamuro@aist.go.jp  
<http://staff.aist.go.jp/myamamuro/enFolder/topenglish.html>



Bill Young  
Science Editor  
IGBP Secretariat  
Royal Swedish Academy of Sciences  
Box 50005  
S-104 05 Stockholm  
Sweden  
Tel: +46-8-16-64-48  
Fax: +46-8-16-64-05  
Email: [bill@igbp.kva.se](mailto:bill@igbp.kva.se)

Luca Zaggia  
S. Polo, 1364  
Telephone: 39 041 5216896  
Fax: 39 041 5216815  
Email: [l.zaggia@ismar.cnr.it](mailto:l.zaggia@ismar.cnr.it)  
www: [www.ismar.cnr.it](http://www.ismar.cnr.it)

D. Zanchettin  
Environm. Sc. Dept.  
University of Venice  
Dorsoduro 2137  
30123 Venice  
Italy  
Email: [davidoff@unive.it](mailto:davidoff@unive.it)

Matthias Zessner  
Karlsplatz 13  
1040 Vienna  
Austria  
Telephone: 43 1 5880122616  
Fax: 43 1 5880122699  
Email: [mzessner@iwag.tuwien.ac.at](mailto:mzessner@iwag.tuwien.ac.at)  
www: [www.iwag.tuwien.ac.at](http://www.iwag.tuwien.ac.at)