Data requirements for global-scale coastal vulnerability analysis and the DINAS-COAST database

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Global-scale data

- Perceived need for global-scale geographical analysis
- Availability of spatial data is an essential element
- Advancements in data capture and input techniques
- Limitations regarding the effective merging of data

Dynamic and Interactive Assessment of National, Regional and Global Vulnerability of Coastal Zones to Climate Change and Sea-Level Rise
The DINAS-COAST project
EU / IGBP-LOICZ

http://www.dinas-coast.net

The Consortium

Potsdam Institute for Climate Impact Research, Germany (Co-ordinator)
Flood Hazard Research Centre, Middlesex University, UK
WL|Delft Hydraulics, The Netherlands
The Centre for Marine and Climate Research, Hamburg University, Germany
The Free University of Amsterdam, The Netherlands

The DIVA Tool

- Main product/deliverable of DINAS-COAST
- A dynamic, interactive and flexible assessment tool
- A CD-ROM that includes: Models, GUI and database
- It will enable consistent and comparative analyses of mitigation and adaptation policies for a range of emission, s-e and other scenarios
- User friendly, low requirements so that it can be used by policy makers everywhere in the world

The need for a new database

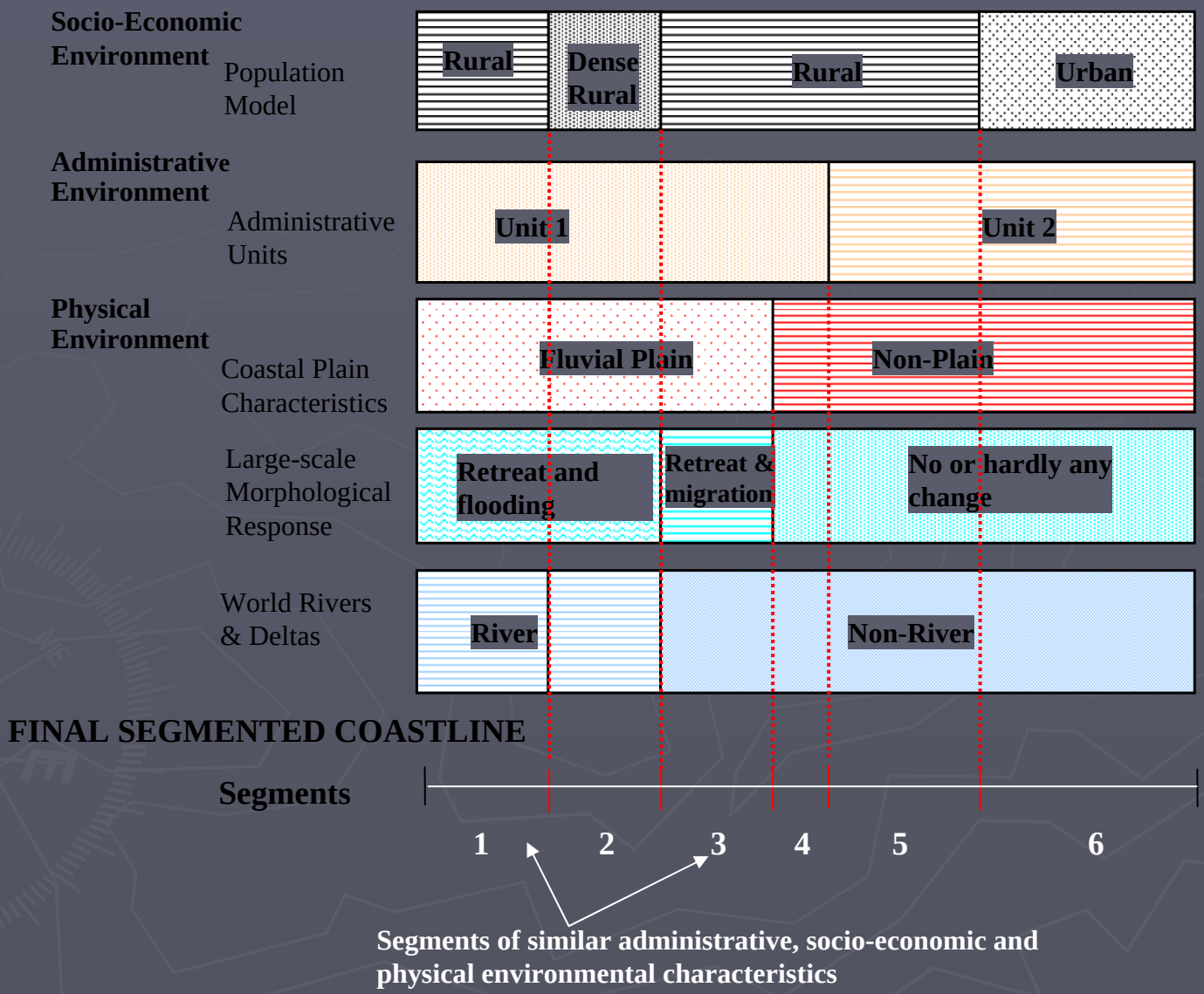
- Lack of a consistent evaluation of coastal vulnerability
- Lack of a global database that addresses the information needs for international climate policy
- Existing data are not directly accessible by researchers and policy makers

Lack of a coherent and non-fragmented source of data input at a global scale

DIVA Data Model

- DIVA requirements
  - Database size
  - Processing Speed
  - GUI requirements
- Simple representation of the coast
- Coastline segmentation based on attributes that would provide homogeneous units in terms of variability in vulnerability

DINAS-COAST Segmentation Procedure



Adopted from McFadden et al. (2003)

Advantages and Disadvantages of the Model Employed

- ☺ Improvement compared to previous efforts of coastline decomposition
- ☺ Reduces the complexity of the reality and complies with the requirements of DIVA
- ✘ Represents the coast in a static way
- ✘ Relies on a particular linear feature

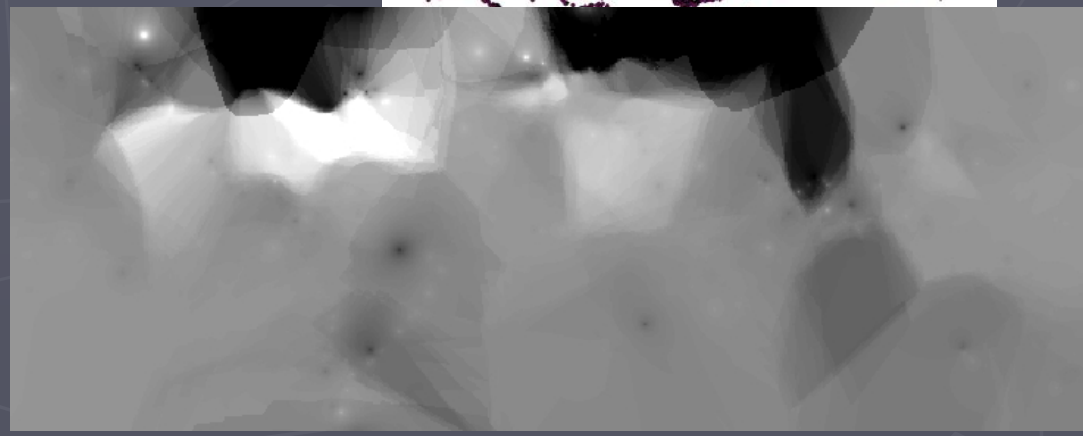
Compiling the database

- Existing Archives
- Paper Maps
- Point measurements
- Tabular data

- Lack of global datasets, characteristic of the fact that coastal vulnerability was not regarded as a global issue

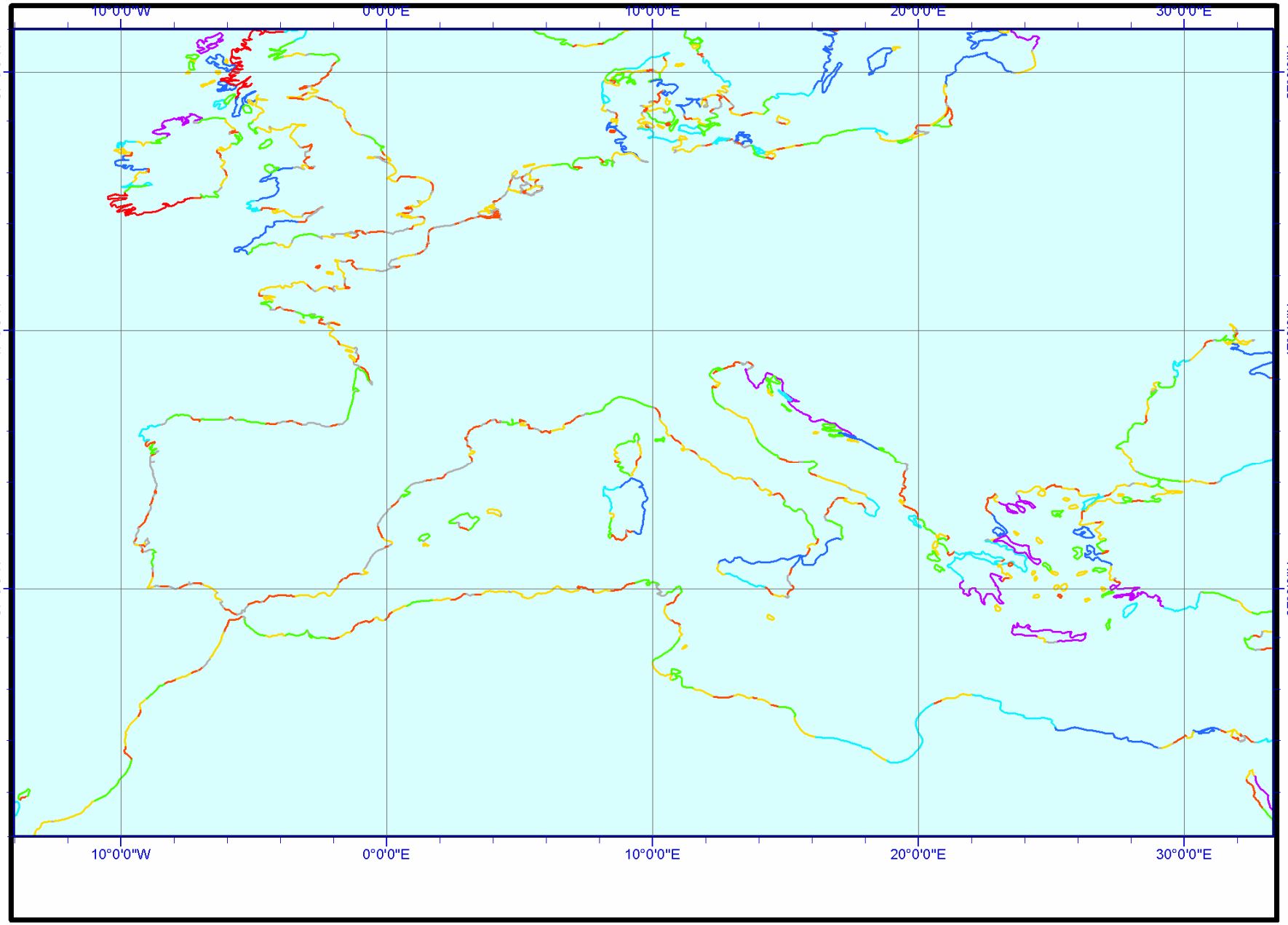
Examples of datasets

- Coastline vector
- Elevation, Bathymetry
- Population
- Wetland characteristics
- Subsidence/uplift
- Tidal range
- World Rivers



Segmentation and Processing

- Approximately 12,000 segments
- All attributes were “attached” to the coastline segments
- Over 50 physical and socio-economic parameters were referenced to these coastline segments
- Includes descriptive metadata


10°0'0"W
0°0'0"E
10°0'0"E
20°0'0"E
30°0'0"E
57°0'0"N
47°0'0"N
37°0'0"N

Attributes

Property	Value
FID	3498
SEGID	723
S1	0.148
S10	0.275
S100	0.405
S1000	0.539
BRF	0.3
SMAX	3.539
LONGI	26.326
LATI	38.338
SLOPECST	1.238
SLOPEWGT	0.2
SLTRWGT	0.3
WAVECLIM	2
TIDALRNG	1
UPLIFT	0.02
RIVERID	-9999
BASINID	-9999
AREA1	143
AREA2	4
AREA3	6
AREA4	3
AREA5	6
AREA9_12	40
CLSID	723
LENGTHY	317.041
NEWID	1487
COUNTRID	187
MAJORITY	16
ORDER_ID2	-9999
CLSFID	722
COUNTRID_1	188
TOURIST_AR	7083000
IDCOUNTRY	187
BASINF	-9999

SEGID	CPC	WMP	S1	S10	S100	S1000	BRF
5106	0	0	0.412	0.512	0.612	0.712	0.000
5115	0	0	0.514	0.655	0.803	0.956	0.000
5120	4	0	0.319	0.419	0.519	0.619	1.000
5132	0	0	0.630	0.758	0.891	1.027	1.000
5166	5	0	0.965	1.087	1.213	1.341	0.100
5167	5	0	0.891	1.020	1.152	1.288	1.000
5202	0	0	0.775	0.875	0.975	1.075	1.000
5168	0	0	1.303	1.427	1.554	1.685	1.000
5169	0	0	0.921	1.055	1.194	1.338	1.000
5171	5	0	1.209	1.410	1.627	1.856	1.000
5172	0	0	1.266	1.408	1.556	1.709	1.000
5173	0	0	1.340	1.490	1.648	1.812	1.000
5175	5	0	1.224	1.388	1.563	1.745	1.000
5177	5	0	1.165	1.306	1.454	1.606	1.000
5178	5	0	0.967	1.130	1.303	1.483	1.000
5179	5	0	1.020	1.192	1.375	1.567	1.000
5180	5	0	1.151	1.316	1.490	1.672	1.000
5181	5	0	1.158	1.299	1.445	1.597	1.000
5203	0	0	1.478	1.578	1.678	1.778	1.000
5204	0	0	0.354	0.454	0.554	0.654	1.000
5218	0	0	0.493	0.593	0.693	0.793	1.000
5221	0	0	0.414	0.514	0.614	0.714	0.000
5265	4	0	0.465	0.565	0.665	0.765	1.000
5266	4	0	0.359	0.459	0.559	0.659	1.000
5267	4	0	0.400	0.500	0.600	0.700	1.000

Conclusions

- DINAS-COAST has produced a global database of physical and socio-economic parameters of the coast
- Fundamentally different structure from other global databases
- Provides a coherent data system
- Makes data available to users with low-specification hardware and software
- Reflects the needs and priorities of the project but the structural advances will impact a larger community

Database will be publicly available

Thank you!

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DINAS-COAST
http://www.dinas-coast.net/