Operational early-warning prediction system for flooding due to sea level increases

CoastPredict project proposal

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Main goal of the project

Development of a worldwide operational early-warning prediction system related to **sea level** increases due to **storm surges** or **tsunamis**

Methodology

Use of submarine telecommunication cables

(estimation of sea level and transports) + available tide-gauge stations

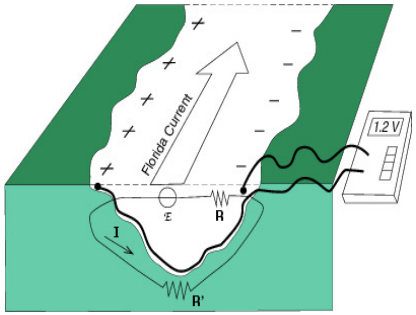
+

Nested with numerical hydrodynamic modeling (downscaling at the coastal zone)

↓

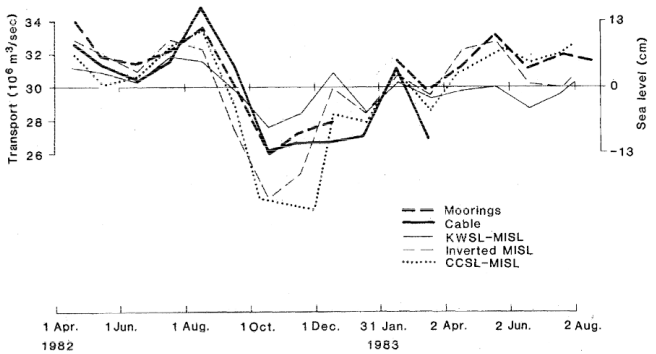
Short-term forecasts → Warning Alerts

<u>Tested Technology – Several local applications – Transport</u>



Florida Current

(Larsen and Sandord, 1985)



Major benefits:

- Warning and protection of coastal zones in risk

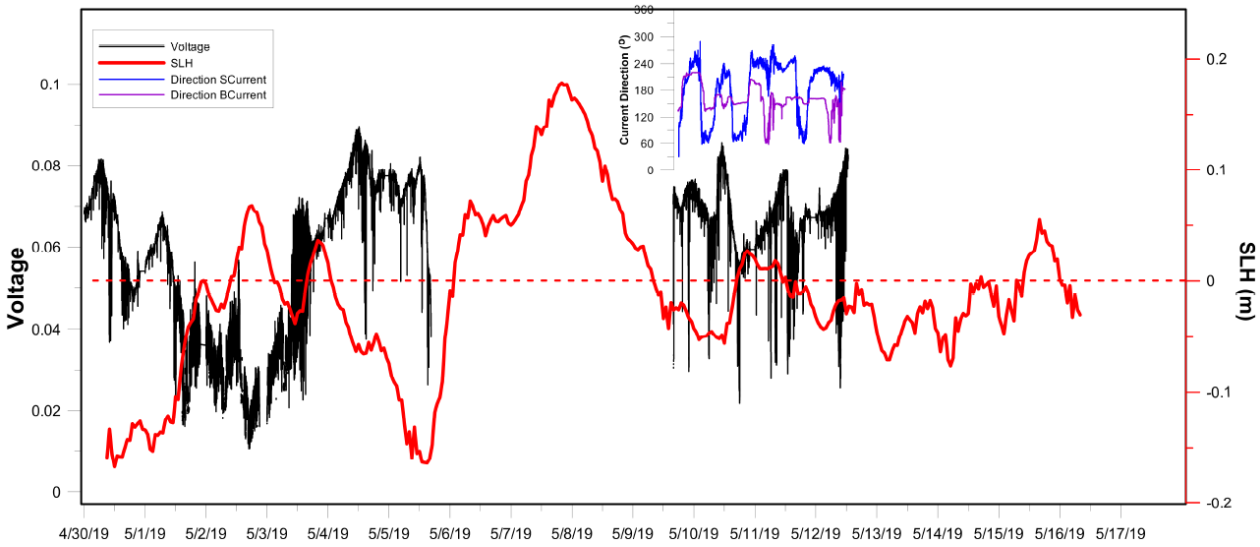
- Low cost of implementation, operation and maintenance
(use of existing infrastructure)

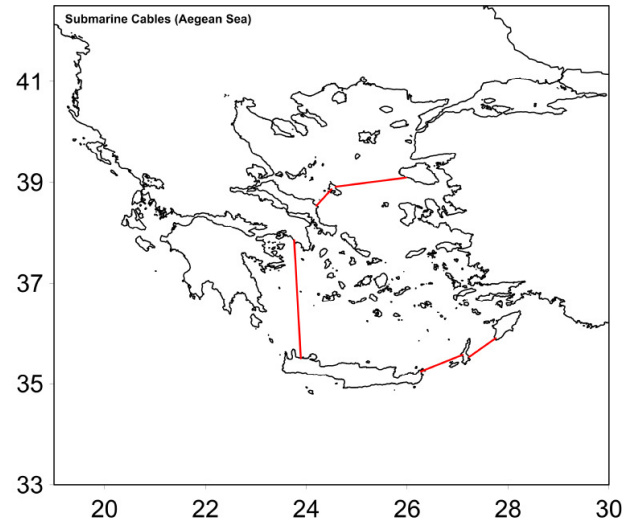
- Capability of continuous operation

- Full coverage
(extensive regions are currently not included in existing operational systems)

- Tsunamis and large low pressure systems that affect large regions

Preliminary Results – Pilot Application in Mediterranean Sea





Expected Outcomes

- Protection of coastal population and infrastructure
- Coastal erosion studies
- Long-tern sea level observations for climatic studies
- Improvement of integrated management of the coastal zone

Contribution to “the Global Coastal Ocean” concept

- Overcome the frontiers on the observing capabilities from the deep ocean to the coast → may cover the entire coastal ocean → Enhance international cooperation
- Low cost and available infrastructure → connecting mainland with islands → connecting countries and continents
- Long-term observations → climate change impact on the frequency and intensity of storm surges

End-Users

- Coastal population (majority of global population)
- Stakeholders responsible for the marine and coastal safety against natural disasters and flooding (coastaguard, civil protection, municipalities etc)
- Design and management to improve coastal resilience and climate change adaptation

Geographical areas of implementation

- Global coastal ocean

- Regions affected by earthquakes (tsunamis) and severe low-pressure systems (storm surges)

- Regional systems in areas where numerous telecommunication cables exist and flooding risks are frequent

- Beneficial for countries with minimal resources to build and maintain large scale early-warning systems against marine-induced hazards

- Areas with long coastlines and low-land elevation (e.g. Southeast Asia)

Implementation phases

1. Design of the observational system and implementation, validation, calibration of global/regional numerical models.

2. Construction and testing of the additional infrastructure to obtain the voltage measurements from the submarine telecommunication cables. Development and testing of the algorithms that provide the sea level information.

3. Integration with existing observational coastal systems (e.g. satellite coastal altimetry, tide-gauges)

4. Development of the operational systems by nesting field observations to the hydrodynamic numerical predictions.

thank you


HIGH TIDE
allen
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