

## O10.1

### **Resilience of the world's coastal land areas at the pursuit of tackling escalating pressures and vulnerabilities with increasing adaptive capacity**

Olli Varis, Maija Taka, Matti Kummu

Aalto University, Finland

#### **Abstract**

##### **Introduction**

Embraced by the opportunities of both land and ocean, coastal areas allure expanding human populations and associated economic activities. Often those are particularly prominent in terms of human and economic development as well as income opportunities. At the same time, they face growing climatic and environmental pressures due to climate change, degradation of both terrestrial and aquatic ecosystems, and expansion of built areas. The interface of sea and land area introduces impacts simultaneously from both the above catchment and the bordering sea.

##### **Methods**

We analyze the capacity of the coastal societies to cope with environmental and ecological vulnerabilities by using a geospatial social-ecological systems approach. Through the concept of resilience, we relate three key adaptive capacity factors (governance, economy, human development) to three environmental pressure factors (human footprint, coastal hazards, coastal marine pollution) from 1990 to 2015.

##### **Results and discussion**

The analysis reveals the increasing accumulation of people, particularly urban agglomerations, to coastal areas, and the subsequent land-use changes and environmental defies, both in vast dimensions. Our definition of coastal area entails a set of combinations of distance from the sea and altitude. Asian coasts have shown largest changes, and their expanding adaptive capacity is prodigious, allowing some growth in resilience despite of surmounting vulnerability. In North America and the Caribbean, changes have been more modest, but increasing vulnerability appears to defy the high adaptive capacity in many areas. The above-mentioned areas are particularly much exposed to hazardous events. The other coastal areas show less dramatic changes, but Africa's looming coastal crowding, paired with low growth in adaptive capacity raises resilience related concerns.

##### **Keywords**

Resilience, Coastal zone, Adaptive capacity, Vulnerability