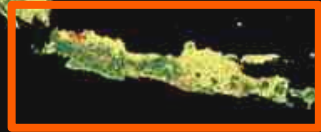


Review on land subsidence and socio-hydrology of northern Java, Indonesia



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Source: ESA land cover map

Impact of land subsidence recognized by communities



Elevated sea dike at **Jakarta** (photo by Deltares)



Flooded street (no rain) at **Surabaya**

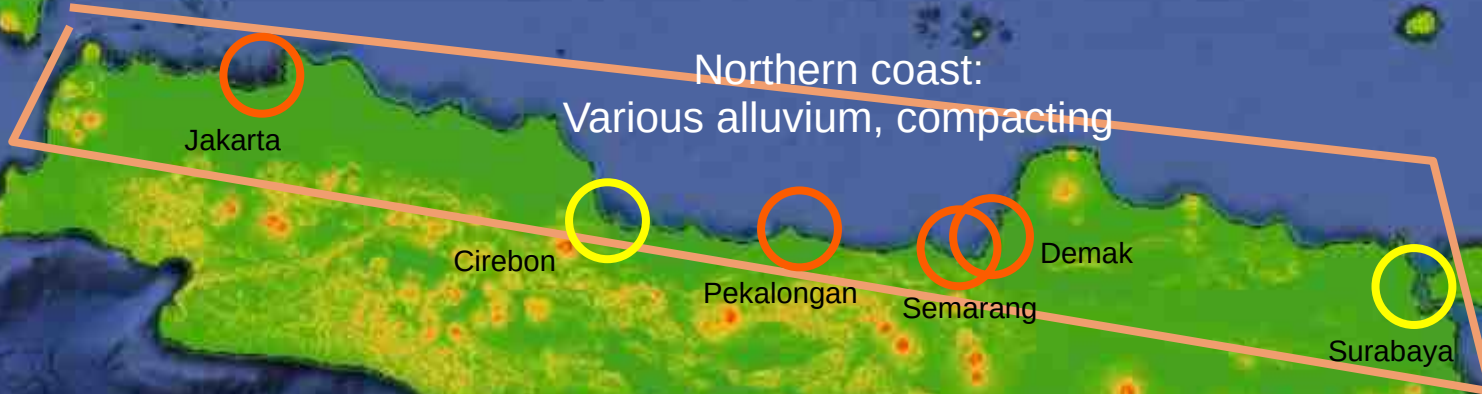
A race to the bottom at **Semarang**



Coastline retreat 2005-2020 at **Demak**



Study area



Northern coast:
Various alluvium, compacting

Jakarta

Cirebon

Pekalongan

Semarang

Demak

Surabaya

Southern coast:
Hilly karst, inclining

Sunda trench

○ Cities with significant land subsidence

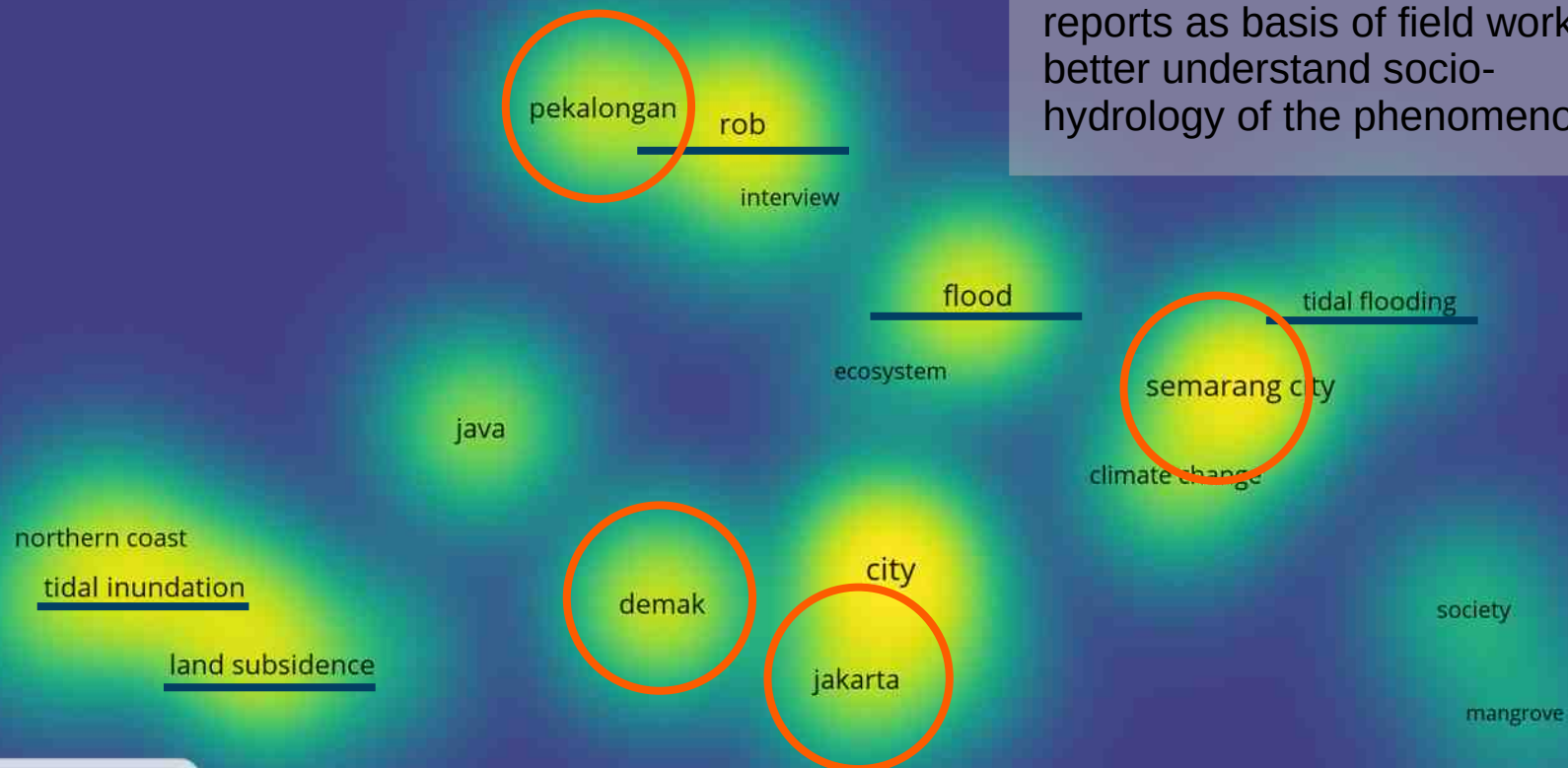
○ Less referred cities

Image source: digital elevation model
using Google Earth Engine

Important keywords

pekalongan regency

A review of 252 scientific reports as basis of field work to better understand socio-hydrology of the phenomenon



VOSviewer

Results of meta data & initial field study

- *Rob* (flood from sea) has been recognized since 1970s along with spring tide, but then become a norm (diurnal) since 1980s, 1990s, or later depending on the site
- The term *rob* was supposedly born in Semarang and then spread out to other coastal cities in northern Java and beyond
- Majority of literatures observed science and engineering (monitoring, mitigation options) with few social studies
- Rate of land subsidence is in the order of cm/year (28cm/year at the worst place in Jakarta) while either sea level rise or natural compaction are each at mm/year (in general at 2-3mm/year)
- At the worst, coastline retreat has been up to 5km inland (Demak) and was enforced by anthropogenic land subsidence (ground water extraction and others)
- Climate change could contribute to coastline retreat
- Flood risk assessment could help to prioritize adaptation/mitigation options to abate land subsidence