Science Cooperation Opportunities/Tools and Technologies

South China Sea Coral Reef Interdependence and Conservation In The Era of Changing Climate

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Coral reef biodiversity

284,300 Km²
< 0.2% ocean

100,000 known species
But over millions (included micro-) unknown

1 billion people rely on healthy coral reefs

Near 30 billions USD global net benefit provided by coral reefs.

Gifted by Ove Hoegh-Guldberg

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Fish species = 3794 (FishBase 2019)
Scleractinian coral species = 571 > 566 @CTI (Huang et al. 2016)
Four major threats to coral reefs

- Overfishing (過漁)
- Pollution (污染)
- Habitat destruction (棲地破壊)
- Climate change (氣候變遷)
South China Sea—the protein provider for human populations
Habitat destruction - territorial disputes and extinction of giant clams by China

- Mora et al. (2016) discovered that the increasing of artificial islands area was inverse with the decreasing of coral reefs.

- McManus (2017) indicated over 160 km\(^2\) of coral reefs have been destructed, of which 17 km\(^2\) form land reclamation and 143 km\(^2\) from the giant clam fishery.

Mora et al. (2016)
Climate change

Greenhouse gas emission
e. g., CO₂

Rising sea temperature causes mass bleaching (2020 coral bleaching in Dongchi Island, Taiwan)

Intensified disturbances
Global coral reef ecosystem (including South China Sea) severely impacted.

Great attention and effort of conservation.

0.5°C makes great difference!
Science cooperation opportunities in the era of changing climate

1. Coral reef interdependence, resilience, and governance
2. Oceanic, atmospheric, and biogeochemical processes and typhoons
3. Social-ecological system and food security
4. Coral reef conservation strategy under “1.5C scenario”

Conservation and “zero loss” of coral reefs

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