FACT ! SHEET

ZMT LEIBNIZ CENTRE for Tropical Marine Research

CIRCULATION in Hainan, China

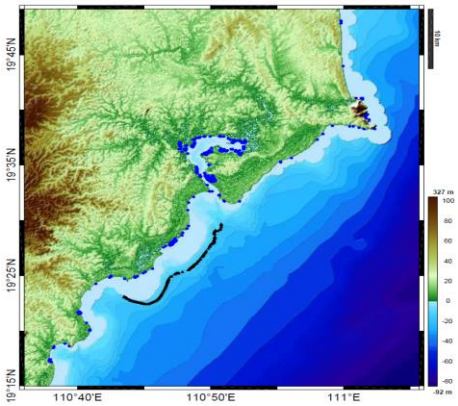

Fig. 1: Bathymetry (m) of eastern Hainan coastal waters. Blue dots indicate areas potentially flooded by sea level rise scenarios. Black triangles show the locations of fringing reefs, which potentially can also be flooded.

Knowledge about ocean circulation is an essential prerequisite for the understanding of any physical, chemical and biological process in a marine system, since it constitutes the underlying physical background signal.

What affects ocean circulation?

Three major forcing functions drive ocean circulation: winds, tides and density gradients. Another important factor to determine the circulation by means of numerical models is the underlying bathymetry, which is given for the East-Hainan coastal waters in Fig.1. In Fig. 2 a resulting circulation pattern for the surface layer accounting for all these driving forces is presented.

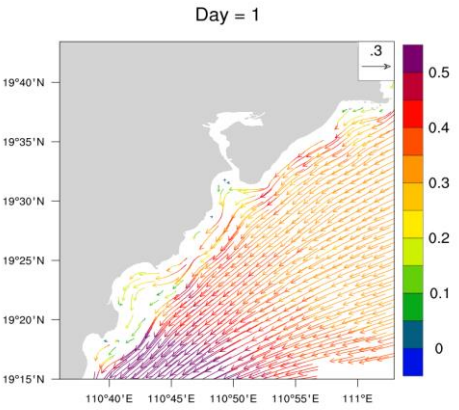

Fig. 2: Typical sea surface circulation (m/s) in the East-Hainan coastal waters during winter monsoon (mostly southeastward flow).

Climate tracer study

To demonstrate the impact of climate change, three tracer scenarios have been performed:

- S0: no sea level change;
- S1: 1 m sea level increase, the fringing reefs are growing and still up to the sea level;
- S2: like S1, but the fringing reefs are not growing and under the sea level;

Simulation results show that more particles can leave the back reef area for scenario S2, since the fringing reef are not growing, allowing the cross-reef exchange (Fig. 3).

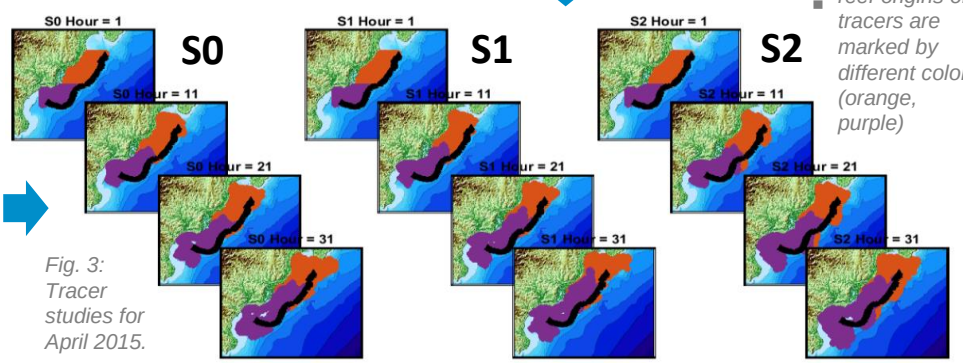

Fig. 3: Tracer studies for April 2015.

! *Different back reef origins of tracers are marked by different colors (orange, purple)*

Imprint

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