

## Study on a relationship between New Guinea coastal upwelling in the Bismarck Sea and onset of El Nino events

Takuya Hasegawa<sup>1\*</sup>, Toru Miyama<sup>2</sup>, Jing-Jia Luo<sup>3</sup>, Bunmei Taguchi<sup>4</sup>, Ayako Seiki<sup>2</sup>

<sup>1</sup>JAMSTEC/RIGC, ESC, <sup>2</sup>JAMSTEC/RIGC, <sup>3</sup>Bureau of Meteorology/Australian Government, Australia, <sup>4</sup>JAMSTEC/ESC

We investigate oceanic and atmospheric variations related to coastal upwelling along New Guinea Island north coast before onset of El Nino event. In our previous studies, existence of the coastal upwelling and related SST cooling near New Guinea Island during December 2001 to January 2002, which was prior to onset of 2002/03 El Nino event, were shown by observational data. Furthermore, we explored cooling mechanism related to the coastal upwelling using high-resolution OGCM (OFES) hindcasts using NCEP/NCAR forcing and QuikSCAT forcing during 1981-2010. In this study, we analyze long-term output of 200-year simulation of high-resolution air-sea coupled general circulation model (SINTEX-F ver2). SST patterns similar to the observed coastal upwelling along north coast of New Guinea Island appear before onset of El Nino-like events in the SINTEX-F ver2 simulation. At those periods, positive zonal SST gradients in the western equatorial Pacific also appear in association with the SST cooling near New Guinea Island. Relatively strong westerly surface winds, which are expected by the positive SST zonal gradients, also appear in those periods. Such oceanic and atmospheric relationship is similar to that of observation for SST cooling period of December 2001 to January 2002. It might suggest that the SST cooling along north coast of New Guinea Island can relate to El Nino onset via atmospheric changes. We will also explore upper-ocean structure during the SST cooling period to further explore a relationship between the SST cooling pattern and New Guinea Island coastal upwelling before El Nino onsets using the SINTEX-F ver2 simulation.

Keywords: Air-sea interaction, coastal upwelling, Pacific warm water pool, El Nino onset