

## Impact of aerosol on biogeochemistry in the Bay of Bengal

\*Makio Honda<sup>1</sup>, Kazuhiko Matsumoto<sup>1</sup>, Eko Siswanto<sup>1</sup>, Yugo Kanaya<sup>1</sup>, Fumikazu Taketani<sup>1</sup>, Takuma Miyakawa<sup>1</sup>

1. Japan Agency for Marine-Earth Science and Technology

It has been reported that aerosol supplied from the land to the ocean affects ocean biogeochemistry. Not only in the modern age, but also during the glacier age, macro- and micro-nutrient in aerosol possibly increases ocean nutrients resulting in increases of primary productivity and settling particles. On the other hand, aerosol input possibly has negative impact: the harmful trace metals in aerosol might damage ocean primary producer and some chemical substances might accelerate the ocean acidification. The Bay of Bengal (BoB) is located in the northeast of the Indian Ocean. The BoB is semi-closed tropical maritime surrounded by the land on its north, east, and west. In addition to strong insolation, large amount of fresh water input from Ganges and Brahmaputra rivers that are one of largest river in the world and large precipitation during the boreal summer monsoon season strongly stratify the ocean. As a result, the supply of nutrient from the subsurface is strictly inhibited and the BoB is oligotrophic. As mechanisms of nutrients supply to the sun-lit layer in the BoB, in addition to passes of meso-scale cyclonic eddy and of meteorology turbulence such as cyclone, aerosol input is very important. Because of the unique monsoon system in the Indian Ocean, the northeast wind is pre-dominant during winter season. Thus, especially in winter, natural and anthropogenic aerosol that originates from the consumption of fossil fuel and the biomass burning are largely transported from the land to the BoB. Another characteristic of the BoB is that about one-quarter of the world population live around the BoB. Especially, Indo and Bangladesh are well known as a country that magnitude of air pollution (concentration of PM<sub>2.5</sub>) is quite high and gigantic anthropogenic aerosol are emitted. It is reported that, in spring, an amount of anthropogenic aerosol input to the BoB is much higher than that to the Arabian Sea. It has been reported that concentration of iron (Fe) in the anthropogenic aerosol that serves as micronutrient is higher and dissolved more easily (namely, more bioavailable) than that in the natural aerosol. Thus in future, increase of anthropogenic aerosol input might enhance ocean primary productivity in the pelagic ocean with Fe deficiency. Moreover, large amount of aerosol that is attributed to wildfire, volcanic explosion and biomass burning are emitted from Indonesia located in the southeast of the BoB. These aerosols possibly affect biogeochemistry in the BoB too. There is another negative feedback that irradiance to the BoB would decrease resulting decrease of primary productivity if large amount of aerosol were transported over the BoB. Therefore the BoB is a “hot spot” for the study on impact of aerosol on ocean biogeochemistry. This presentation reviews previous study on this issue and introduces a scientific cruise planned in 2018.

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