3.141 Spatial and temporal changes of atmospheric PM2.5 over the Seto Inland Sea observed on board the training ship Fukaemaru.

Early Career Scientist

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Abstract:

Since the environmental quality standards for $PM_{2.5}$ were established in Japan on September 9, 2009, the atmospheric monitoring network for $PM_{2.5}$ have been expanded over land area and then the $PM_{2.5}$ monitoring data have been accumulated. The data indicated that large numbers of monitoring stations recording higher $PM_{2.5}$ concentrations existed around the Seto Inland Sea as compared with the other regions in Japan. The key factor for increased $PM_{2.5}$ has not resulted to specify yet. To understand the factor, since 2016, we started to observe the ambient concentrations of $PM_{2.5}$ and PM $_{2.5}$ precursors over the Seto Inland Sea on board T/S Fukaemaru owned by Kobe University. In this paper, we will report the observation during the Fukaemaru spring research cruise on March in 2017 with round voyage (Kobe ⇔ Beppu). $PM_{2.5}$, SO_2 and NO_x concentrations in the marine air, which was intaken to the laboratory on the ship were measured by PM-712, SA-633, NA-623 (Kimoto Electric Co., Ltd). To remove the exposure from own exhaust gases, hourly concentrations were calculated using observed one-minute data after screening. On the out-bound cruise from March 15^{th} to 16^{th}, 2017, hourly $PM_{2.5}$ concentrations were quite low from -1.9μg/m^3 to 21.3μg/m^3. On the in-bound cruise from March 20^{th} to 22^{th}, 2017, on the other hands, hourly $PM_{2.5}$ concentrations were higher than those on the out-bound cruise. Considerably high $PM_{2.5}$ consentrations, 29.1μg/m^3 ~ 44.6μg/m^3 were observed at Beppu Bay, Iyo Nada, and Aki Nada located in the western parts of the Seto Inland Sea on March 20^{th}, 2017. At the same period, considerable high $PM_{2.5}$ were recorded at some monitoring station around the Seto Inland Sea. Therefore it was suggested that high $PM_{2.5}$ concentrations observed on board Fukaemaru was affected by regional pollution over Seto Inland Sea.