

# EFFECTS OF AIRBORNE PARTICLE ON OCEAN ECOSYSTEM IN THE SEAS SURROUNDING TAIWAN IN THE WESTERN NORTH PACIFIC: USING SATELLITE DATA

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**ABSTRACT:** In this study, the airborne particle events are distinguished by AERONET observation data. The Optical Depth and Chlorophyll-a concentration, offered by Moderate-resolution Imaging Spectroradiometer (MODIS) Terra, is used to analyze the effects of airborne particle on ocean ecosystem in the seas surrounding Taiwan and the western North Pacific.

According to the analysis of the correlation between the monthly mean aerosol and the Chlorophyll-a concentration, the higher correlation is found 2003, 2004, 2005, 2007, and 2010. Generally, the distribution area of the correlation coefficient ( $R^2 > 0.5$ ) is mostly less than 2%, but in 2007 and 2010, it is 2.1% and 3.4% respectively. The end of winter and spring are the seasons for sandstorms, so in this study, the analysis of the correlation between aerosol and Chlorophyll-a concentration during January and May indicates that the distribution area of the correlation coefficient ( $R^2 > 0.5$ ) in the years including 2002, 2003, 2005, 2007, 2011, 2012, and 2013 all exceeds 4%. In addition, the analysis of the correlation between aerosol and Chlorophyll-a concentration during January and March shows that the distribution area of the correlation coefficient ( $R^2 > 0.5$ ) in 2002, 2003, 2004, 2008 and 2012 even exceeds 10%. The statistical data offered by AERONET show that sandstorms occurred more frequently in the springs of 2007 and 2010. Although both the AOD and the Chlorophyll-a concentration in the coastal waters are estimated higher, their correlation isn't more obvious than it in the offshore waters. Maybe, the Chlorophyll-a concentration of the coastal area is impacted by the other land factors, instead of aerosol. Oppositely, in the offshore waters, aerosol apparently impacts the Chlorophyll-a concentration.

In this study, the data actually show that airborne particle may improve the growth of phytoplankton, but not every event brings the same effect. Probably, the different results are determined by the component of aerosol, wind speed, wind direction, and current.

**KEYWORDS:** sandstorm, Chlorophyll-a, aerosol