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Physical and optical aerosol properties at the Dutch North Sea coast based on AERONET observations

J. Kusmierczyk-Michulec^{1,*}, G. De Leeuw¹, and M. M. Moerman¹

¹TNO-DSS, P.O. Box 96864, 2509 JG, The Hague, The Netherlands

*on leave from: Institute of Oceanology, Polish Academy of Sciences, Sopot, Poland

Abstract. Sun photometer measurements at the AERONET station at the North Sea coast in The Hague (The Netherlands) provide a climatology of optical and physical aerosol properties for the area. Results are presented from the period January 2002 to July 2003. For the analysis and interpretation these data are coupled to chemical aerosol data from a nearby station of the Dutch National Air Quality Network. This network provides PM₁₀ and black carbon concentrations. Meteorological conditions and air mass trajectories are also used. Due to the location close to the coast, the results are strongly dependent on wind direction, i.e. air mass trajectory. In general the aerosol optical properties are governed by industrial aerosol emitted from various industrial, agricultural and urban areas surrounding the site in almost all directions over land. For maritime air masses industrial aerosols are transported from over the North Sea, whereas very clean air is transported from the NW in clean polar air masses from the North Atlantic. In the winter the effect of the production of sea salt aerosol at high wind speeds is visible in the optical and physical aerosol data. In these cases fine and coarse mode radii are similar to those reported in the literature for marine aerosol. Relations are derived between the Ångström coefficients with both the fine/coarse mode fraction and the ratio of black carbon and PM₁₀.

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