



## **Renewal of aerosol climatology for HARMONIE-AROME radiation parametrizations**

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Aerosol climatology is usually used to account for the aerosol radiative transfer in NWP models. The commonly used Tegen climatology (Tegen, 1997) contains a global distribution of vertically integrated monthly aerosol optical depth (AOD) at wavelength 550 nm for land, sea, desert and urban aerosol. The aerosol inherent optical properties - AOD at the needed wavelengths, single-scattering albedo and asymmetry factor - are prescribed. Copernicus Atmospheric Modelling Service (CAMS) provides real-time and climatological aerosol mass mixing ratio (MMR) as well as IOPs based on climatology.

For HARMONIE-AROME NWP model (Bengtsson et al., 2017) and HCLIM regional climate model we have derived simplified CAMS climatology of AOD at 550 nm in the format of the old Tegen climatology. This has been tried in HCLIM, combined with the old prescribed aerosol IOP's. Over a Northern European domain, the relations between the sea and land aerosol AOD changed significantly, leading to changes in predicted near-surface temperature especially over land areas in summer. The next step is to introduce CAMS MMR for 2003-2011 together with the CAMS IOPs, to be used for all radiation parametrizations available in HARMONIE.

Tegen, I., P. Hoorig, M. Chin, I. Fung, D. Jacob, and J. Penner, 1997. Contribution of different aerosol species to the global aerosol extinction optical thickness: Estimates from model results. *J. Geophys. Res.*, 102, 23895–23915.

Bengtsson, L., U. Andrae, T. Aspeli, Y. Batrak, J. Calvo, W. de Rooy, E. Gleeson, B. Hansen-Sass, M. Homleid, M. Hortal, K. Ivarsson, G. Lenderink, S. Niemelä, K. Pagh Nielsen, J. Onvlee, L. Rontu, P. Samuelsson, D. Santos Muñoz, A. Subias, S. Tijm, V. Toll, X. Yang, and M. Ødegaard Kjøltzow, 2017. The HARMONIE-AROME model configuration in the ALADIN-HIRLAM NWP system. *Monthly Wea. Rev.*, 145, 1919-1935, doi:10.1175/MWR-D-16-0417.1