Evaluation of the MACC reanalysis dust product over Europe, Northern Africa and Middle East using CALIOP/CALIPSO satellite observations

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Here, a detailed evaluation of the MACC reanalysis dust product is presented for the Europe, Northern Africa and Middle East domain using the EARLINET-optimized CALIOP/CALIPSO pure dust satellite-based product LIVAS for the period 2007-2012. Both MACC dust optical depth (DOD) and profile data are compared against satellite-based data. It is shown that MACC captures the major dust hot spots in the area and that overestimates DOD for regions with low dust loadings and underestimates DOD for regions with high dust loadings. In addition, MACC and LIVAS exhibit similar monthly structures. MACC overestimates extinction coefficients compared to LIVAS over regions away from the major dust sources. Over regions close to the dust sources, such as Sahara and Middle East, MACC underestimates strongly only for heights below ∼3-5 km a.s.l. depending on the period of the year. It is shown here that dust loadings appear over remote regions and at heights up to 9 km a.s.l. in MACC contrary to LIVAS.