Estimates of dust emission and deposition over the Arabian Peninsula

ANATOLII ANISIMOV[1]* AND GEORGIY STENCHIKOV[1]

[1]King Abdullah University of Science and Technology, Physical Science and Engineering Division, Thuwal, 23955-6900, Saudi Arabia (*correspondence: (anatolii.anisimov@kaust.edu.sa)

Arabian Peninsula is a region with rapidly growing population and several highly populated aglomerations. The Arabian deserts are among the world's major dust sources. Dust storms are regularly observed in this region, affecting human health and environment. One of the most prominent manifestations of dust storms that could be directly observed is dust depostion. It strongly affects urban environment and human health, as well as is an important component of the nutrient balance of the oceans, which is especially important for semi-enclosed oligotrophic Red Sea and Arabian Gulf.

Despite the importance of dust deposition assessments, there are only scarce direct measurements avalible for the Arabian Peninsula. The observations of airborne dust optical depth both from satellites and surface stations are much more abundant than direct observations of dust depositon. Most of the studies focus on optical effects of airborne dust, whereas robust regional estimatates of dust emission and deposition are still not available. The calculated emissions and depositions vary considerably from model to model.

In this study, we present the climatological characterictics of dust emission and deposition over the Arabian Peninsula based on various sources. We compare the recent atmospheric reanalysis products (MACC, MERRAero, MERRA-2) comprising aerosol components with several high-resolution simulations for Arabian Peninsula performed with WRF-CHEM model [1,2,3]. We assess the climatological dust deposition to the Red Sea and Arabian Gulf and compare it with the dust amounts introduced during major dust storms. We also discuss the new dust deposition measurements at the western coast of the Red Sea, which help to better test and understand the regional dust climatology.

[1] Kalenderski *et al*. (2013) *Atmos. Chem. Phys.* **13**, 1999-2014. [2] Prakash *et al*. (2015) *Atmos. Chem. Phys*, **15**, 199-222. [3] Kalenderski & Stenchikov, (2016) *J. Geophys. Res*., (in review).