

THREE YEAR 3D-DUST MODELLING RESULTS FROM TEL AVIV UNIVERSITY TO BUILD GRIDDED CLIMATOLOGY OF DUST FOR AFRICA AND THE MEDITERRANEAN

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The averaged 3D-dust distribution over the whole Sahara and vicinity regions was estimated and analyzed. This averaged distribution was based on the 3-year database of 48-hour dust forecasts produced by the dust prediction system, which had been developed earlier at the University of Athens and subsequently modified in Tel Aviv University. Vertical distributions of dust reflect differences between the Atlantic and the Mediterranean dust transport. As a whole, the Mediterranean dust is found to be within a wider range of altitudes, penetrating rather higher into the troposphere. On average, dust over the Atlantic penetrates up to < 5 km while over the Mediterranean up to < 8 km. The characteristic feature of dust vertical profiles over the main Saharan dust source near Lake Chad is its maximum concentration near the surface. Dust also maximizes near the surface over another dust source, which is the major one in summer, located in West Africa. The model results are found to be consistent with dust-layer altitude ranges from present-day lidar soundings. Besides, the results are in accordance with general synoptic knowledge of the mechanism of dust transport to the Mediterranean. In order to validate the TAU dust model, a quantitative comparison of model vertical profiles against lidar soundings over Rome (Italy) was made. Positive results of this comparison indicate that the model performance is sufficiently good and appropriate for regular dust forecasting. The knowledge of 3D-dust distribution is a pre-requisite for the inclusion of the aerosol forcing in climate models.