

Interactive comment on “Variability of aerosol, gaseous pollutants and meteorological characteristics associated with continental, urban and marine air masses at the SW Atlantic coast of Iberia” by J.-M. Diesch et al.

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Received and published: 24 February 2012

Reviewer #2 states that the “Meteorology in the area is complex and difficult to model with HYSPLIT in order to interpret high time resolution measurements. Meteorology in the area is significantly influenced by thermally originated local circulations, especially in summer, favored by the regional orographic features (with a high influence of the rivers Tinto and Odiel, channeling the transport of polluted air masses)”.

I agree with Reviewer #2 that the meteorology in this area is very complex under the

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influence of mesoscale processes and that under mesoscale conditions models such as HYSPLIT with input meteorological files of low resolution are not able to reproduce local meteorology adequately. However the meteorology is easier to reproduce by the models in synoptic situations, and under these conditions HYSPLIT model simulations can reproduce atmospheric transport with sufficient accuracy to distinguish between distinctly different source regions as done in this publication. During the DOMINO campaign, treated in this paper, all the meteorological scenarios were governed by the synoptic scale (as typical in the cold months of November and December). In my opinion the orography only has a major influence on the transport properties of air masses in the Guadalquivir valley.

During the EGU 2011 General Assembly I have presented extensive studies (Adame et al., 2011) on the differences of back trajectories between GDAS or ECMW input files as well as with different arrival heights from 10 to 1000 m for the DOMINO campaign. The results obtained within this sensitivity study are very similar due to the meteorological situation that was dominated by synoptic processes.

El Arenosillo has a meteorological tower of 100 m. Recent studies carried out with wind data of 2010 in three levels (10, 50 and 100m) indicate that under synoptic conditions (similar to the DOMINO campaign) the wind direction is similar at the different levels. On the other hand, due to the many studies performed in this rural-background station linked with the meteorological, synoptic patterns and atmospheric compounds, the wind coming from the industrial area present the lowest frequency (minus than 5%) (Adame et al., 2010). The highest frequency is during the warm season with a 7%. We have used a large database series from 1994 to 2010. Thanks to these atmospheric conditions the long range transport studies using HYSPLIT models, similar to this paper, are possible (Toledano et al., 2007 (Journal Geophysical Research); Anton et al., 2011 (Journal Geophysical Research, In press.); Sorribas et al., 2011 (Atmospheric Chemistry and Physics); Cordoba-Jabonero et al., 2011 (Atmospheric Chemistry and Physics); Adame et al., 2012 (Atmospheric Environment, In revision).

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Hence, I suggest that, even though minor local details will probably not be reproduced by the HYSPLIT trajectories presented in this publication, the general separation of the measured data with different source regions is very likely valid. Even though HYSPLIT is not capable of resolving mesoscale processes, for the DOMINO campaign with synoptically dominated meteorological situations it delivers valuable information on the source regions of the air masses.

Author: We thank J.A. Adame Carnero for this helpful clarification of the meteorological situation during the DOMINO campaign. We implemented this information into the manuscript and used it to support our arguments regarding several points raised by the reviewers.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 31585, 2011.

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