

## ***Interactive comment on “Aerosol chemistry above an extended Archipelago of the Eastern Mediterranean basin during strong northern winds” by E. Athanasopoulou et al.***

**Anonymous Referee #2**

Received and published: 22 April 2015

The paper presents a modeling study suggesting that under northerly winds more than two thirds of the aerosols in the Aegean Sea are transported from other regions and that local sources are responsible for less than one third of the aerosol mass.

Comment 1: One of the results of model evaluation is that about half of the organic aerosol mass remains unaccounted. The authors claim that the main cause of this underestimation is the "intense" fire activity in the upwind regions, the Balkans and the Black Sea coast. First, evidence of such activity, e.g., in the form of satellite imagery, could be helpful. Second, a clarification of whether these fires are considered in the global (GEOS-Chem) modeling is necessary. Even if fire emissions were included,

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long-range transport in the free troposphere is not going to be well resolved in the CAMx model. Third, an estimate of the level of impact of these fires onto measured concentrations should be made based on the fire emissions, distance travelled and atmospheric dispersion. The conditions for the given examples, especially Sciare et al. (2011) focusing on a very different region (Paris, France), may be very different from the conditions here.

Organic aerosol underestimation may be due to the underestimation of the emission sources in the region. It may also be due to the underestimation of the secondary organic aerosol formation in the models. The volatility-basis set in CAMx is still under a lot of scrutiny. For these reasons, the claim that the fires are responsible for the underestimation should either be better supported or withdrawn.

Comment 2: The claims to be the first aerosol analysis and the first carefully designed modeling study to capture the airflows over the Aegean are not sufficiently proven and probably unnecessary.

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 9355, 2015.