

## ***Interactive comment on “A novel model evaluation approach focussing on local and advected contributions to urban PM<sub>2.5</sub> levels – application to Paris, France” by H. Petetin et al.***

**Anonymous Referee #2**

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This manuscript presents an interesting method to evaluate a CTM's performance on simulating local and import (advected) PM<sub>2.5</sub> in Paris. It seems worth a publication, but needs a few important clarifications.

(1) 6402-4-11, it seems that at every 6 hrs, there was a determination of which rural site would be the upwind site. Since the measurements are 24 hours averages, there will be 4 upwind sites determined for one day's measurements. What about the cases of which the 4 upwind sites were not determined as a same site for the 24-hr period? How often this happened? Also what about wind speeds' seasonal variation, why a universal 4-hr before Paris chosen for back trajectories? What is the percentage of calm (less than 1.0m/s) winds occurrence?

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(2) 6402-13-14, How is "advected regional background" defined? It's not clear if the upwind sites are representative or not for "advected regional background". There is no further discussion on this in Sect.4.2, as mentioned at 6402-19. Can these three rural sites represent each direction's regional background within a large extent or just nearby area? Or do they all just represent a regional background of the greater Paris region, which in fact was impacted the most by urban Paris' emissions? What are the emissions spatial distribution looks like surrounding Paris?

(3) 6410-1-3. NE sector in the study were determined using simulated back trajectories only 4-hr before Paris, it is quite local, how can it be "linked to advection of continental air masses from the north-east wind sector". Actually, those "4-hr before Paris" trajectories from NE sector can ultimately come from the north west of the continent or ocean, or just come from Paris from 8-hr earlier.

(4) It is not clearly stated or described how the modeled local and advected portions were derived? Was an integrated process analysis tool used to separate advection and chemical etc. contributions?

(5) 6401, How the emissions were vertically allocated in the model?

(6) 6406-15, why not use MFB and MFE here too?

(7) OC is directly measured, why not compare it to modeled OC, instead of OM, which needs an arbitrary conversion.

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Interactive comment on Geosci. Model Dev. Discuss., 6, 6391, 2013.