Atmos. Chem. Phys. Discuss., 15, C11355–C11357, 2016
www.atmos-chem-phys-discuss.net/15/C11355/2016/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Variability of mineral dust deposition in the western Mediterranean basin and South-East of France" *by* J. Vincent et al.

M.-D. Loÿe-Pilot (Referee)

loye@canoe.ens.fr

Received and published: 11 January 2016

This paper deals with the spatio-temporal variability of mineral dust deposition to the Western Mediterranean. Five sites were monitored over 3 years. A good data set is given and its analysis is interesting. However any points are to be discussed more thoroughly and any conclusions should be more cautiously given.

Specific comments

1. Mineral deposition versus Saharan dust deposition.

The protocol used gives the mineral particles deposition. Along the text, mineral dust seems to become more or less equivalent to Saharan dust, especially when annual fluxes are reported (§4-1). Saharan dust weekly deposition events are chosen among

most intense weekly mineral deposition (MID) defined as being above a threshold . There is no true significance for this threshold value. Don't you have any criteria (filter color, mineralogical composition) to separate local/regional terrigenous contribution from long range transported dust? Are the authors sure or did they check that even with low deposition you don't have got Saharan dust. And the opposite seems verified (one case at Le Casset). In fact the question of local / regional mineral dust contribution is not clearly posed and it should be.

2. Adequacy of the data set to the goal of the paper.

Due to the gaps in the monitoring at the different sites over the 3 years, the spatio-temporal pattern of Saharan dust deposition cannot be ascertained with the strong confidence displayed in the conclusions : for example for the South- North deposition gradient, the seasonality of the MIDD for each station (in spite of a partial reduction of the uncertainty : beginning of the paragraph 4.3) and the implicit comparison between the sites displayed in figures 5 and 6.

3. Wet versus dry deposition.

Weekly sampling is not very adequate to check the mode of deposition. However the authors have mitigated this drawback by using dust plumes trajectories and times of arrival. There is, as noted by the authors, an imprecision in the arrival time, but offset by checking rain data 24h before the arrival date. Rain data are checked up to 24h after the arrival of the dust plume: that means that the episode is assumed lasting 24h at the most; but many dust events last more than 24h. This is a first source of uncertainty. The second source of uncertainty comes from the fact that dust deposition may occur only with a few drops which are not recorded either by automatic or manual rain gauges. This leads to an overestimation of dry deposition So the figures given for dry deposition must be looked on with some cautiousness.

Technical comments

ACPD

15, C11355–C11357, 2016

- Representation of dust provenance areas (figures 6 and 8).

The Saharan dust sources areas are now relatively well known. They are more or less displayed in the figure 7. So a more realistic representation of Saharan dust sources is possible. If the authors prefer this geometric representation they should at least exclude the Northern fringe of Western Maghreb.

- Small points

. page 34682, lines 24-25. The deposition reported by Loÿe-Pilot et al (1986, 1996), Guieu et al (2010) and Ternon et al (2010) is Saharan dust deposition, not indifferentiated mineral dust. Idem for the deposition values quoted from these papers.

. According to the point 1, the title of §4.1 should be more precise "... deposition of mineral dust ..." and the title of §4-4 and 4.5 be "... Saharan dust deposition events".

. page 34678, line 15. Quote the reference: " ...in Corsica on 11 years (Loÿe-Pilot and Martin 1996)".

. page 34682, line 11. "...located in the northern western Mediterranean..."

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 34673, 2015.

ACPD

15, C11355–C11357, 2016