PreViBOSS:

PREvision à courte échéance de la Visibilité dans le cycle de vie du Brouillard, à partir de données d'Observation Sol et Satellite

Point hebdomadaire sur les paramètres extraits de la base de données du SIRTA,

Campagne ParisFog 2011-2012

31/10/2011

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Edition	**Révision**	**Date**	**Raison de la révision**
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Suivi des modifications				
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- *I = Inséré S = Supprimé M = Modifié*

All data are averaged over 15-minute resolution.

Fog extinction

Fog extinction derived from three instruments, is compared in ***Figures 1 and 2***. Almost no fogs occurred in October 2010, then November and December 2010 data are shown, to be compared to October and November 2011.

Particle extinction (pec) in fog is directly measured by the DF visibilimeter and the PVM instrument, at 550 nm and 708 nm respectively. In fog, spectral dependence is smaller than instrumental uncertainties, then no difference is expected between 550 and 708 nm. In both years, according DF, extinction is included between 3000 Mm-1 and 30 000 to 40 000 Mm-1 (except in October when fog is not dense) (***Figures 1 and 2***). However, in November and December 2010, values measured by PVM were never larger than 20 000 Mm^{-1}, while pec reaches 30 000 Mm-1 during first days of November 2011 (***Figure 1***). Agreement is good in October 2011 while the slope remains around 0.5 in 2011. There is good agreement in November 2011 for values of DF larger than 20 000 Mm^{-1}, while in November and December 2011, PVM underestimated DF by a factor 2 in the same value interval.

Similarly, while FM underestimates DF by a factor 2 in 2010, the agreement between DF and FM100 is good in October 2011, and between 20 000 and 30 000 Mm^{-1} in November 2011, except few points where FM strongly overestimates DF (***Figure 2***).

Details of comparisons during three fog events are shown in ***Figure 3***. Time series of several parameters deduced from 6 instruments are plotted during one fog event of November 2010, one fog event of October 2011, and one fog event of November 2011: particle extinction coefficient, particle number concentration and particle effective radius. The increase of extinction as the fog appears is well represented during all events, with however a quantitative agreement in 2011 and not in 2010. FM100 and PVM seem to both underestimate the extinction coefficient by a factor 2 on 19 November 2010. However, there is always good agreement between effective radius computed from PVM and FM100, in both years. per (particle effective radius) is larger than 10 µm on 19/11/2010 and on 02/12/2011 and reaches 8 µm on 22/10/2011. During each fog event, droplet number concentration reaches 100 cm^{-3}.

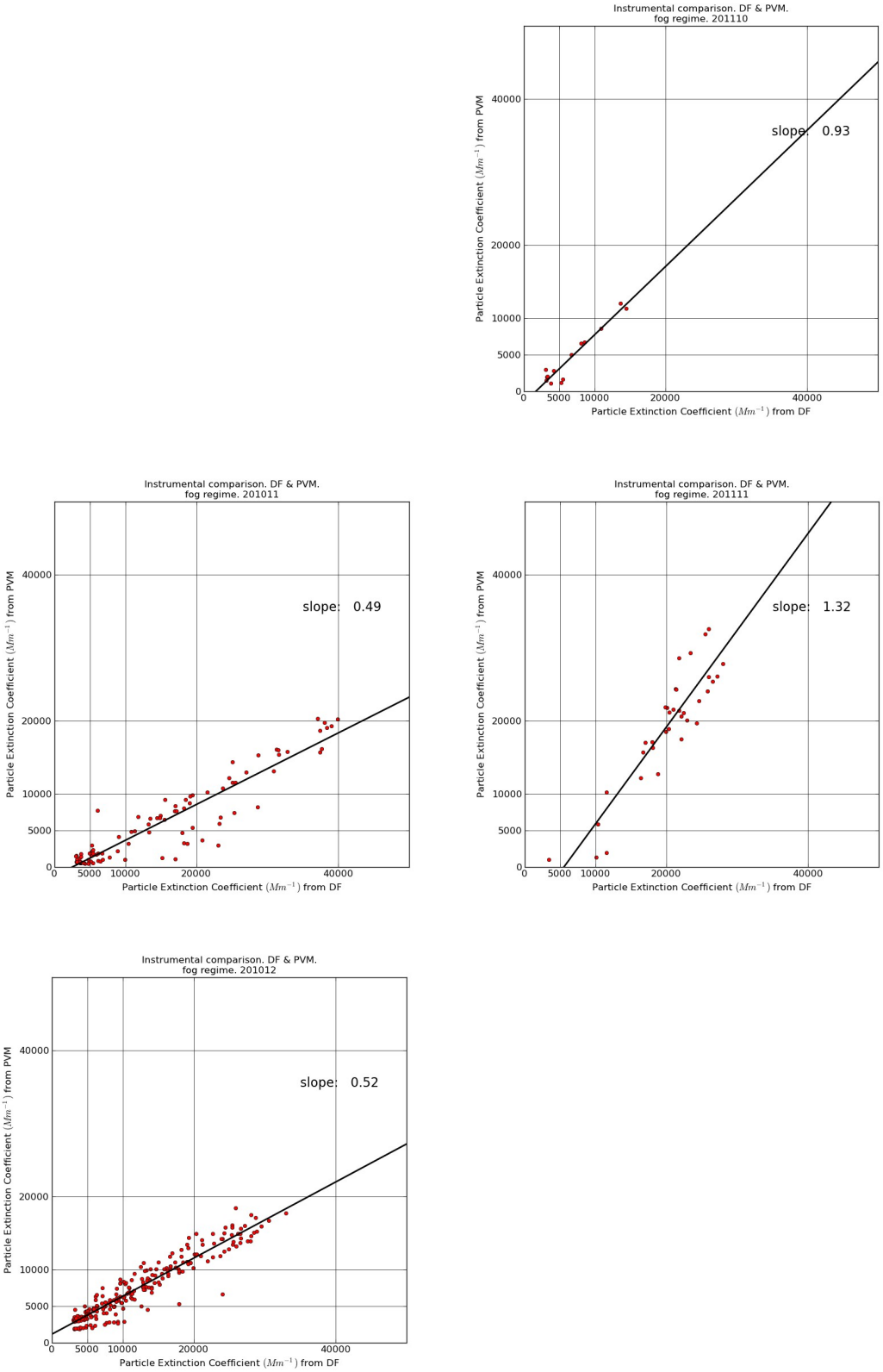

Figure 1. Comparison between DF visibilimeter and PVM instrument, in terms of particle extinction coefficient in fog regime only (visibility < 1000 m), for November, December 2010 (left column), October and November 2011 (right column). The slopes of the linear regression are indicated.

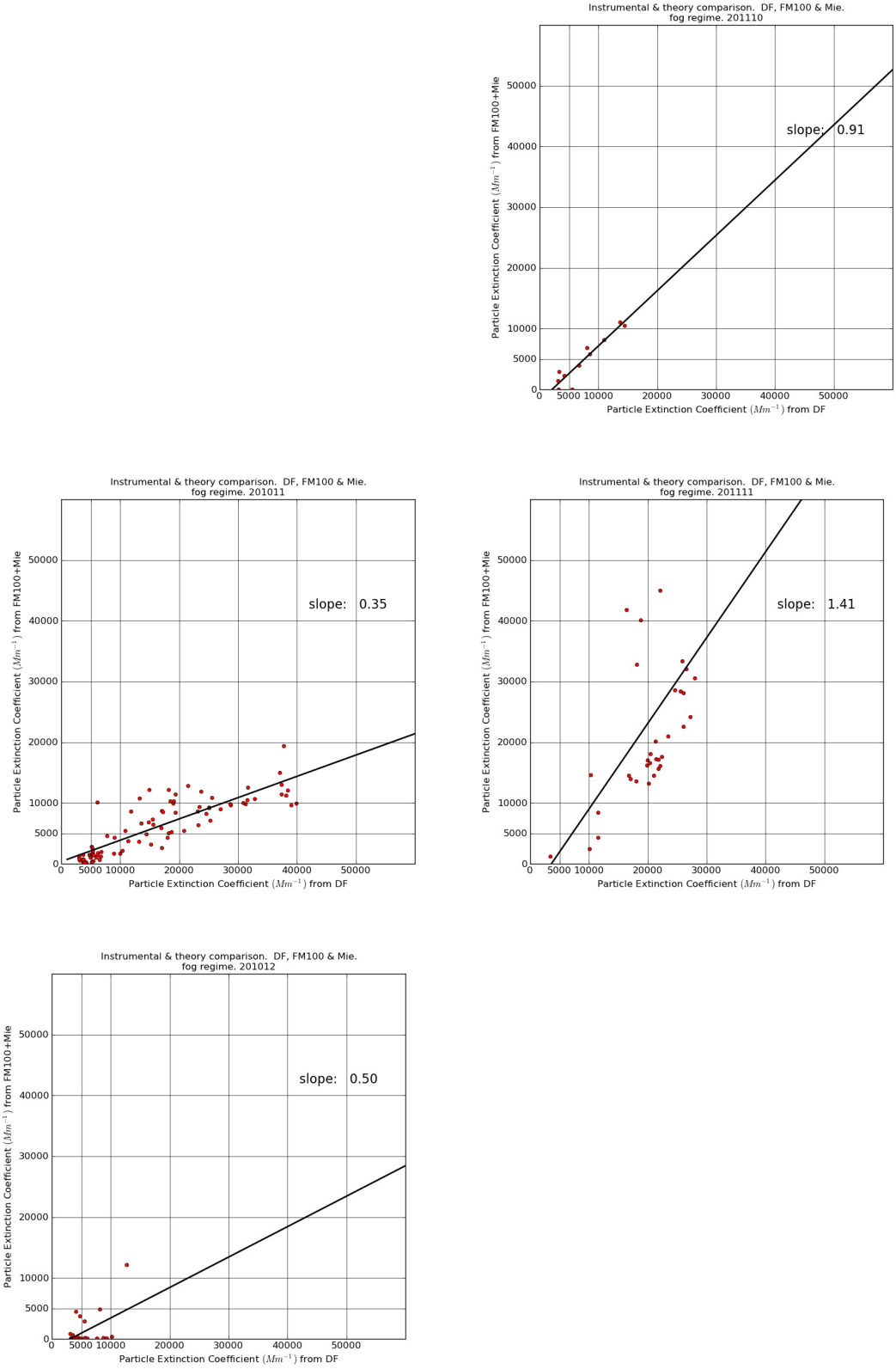

Figure 2. As Figure 1 but for comparison between DF and FM100 particle counter, with extinction coefficient computed according Mie theory.

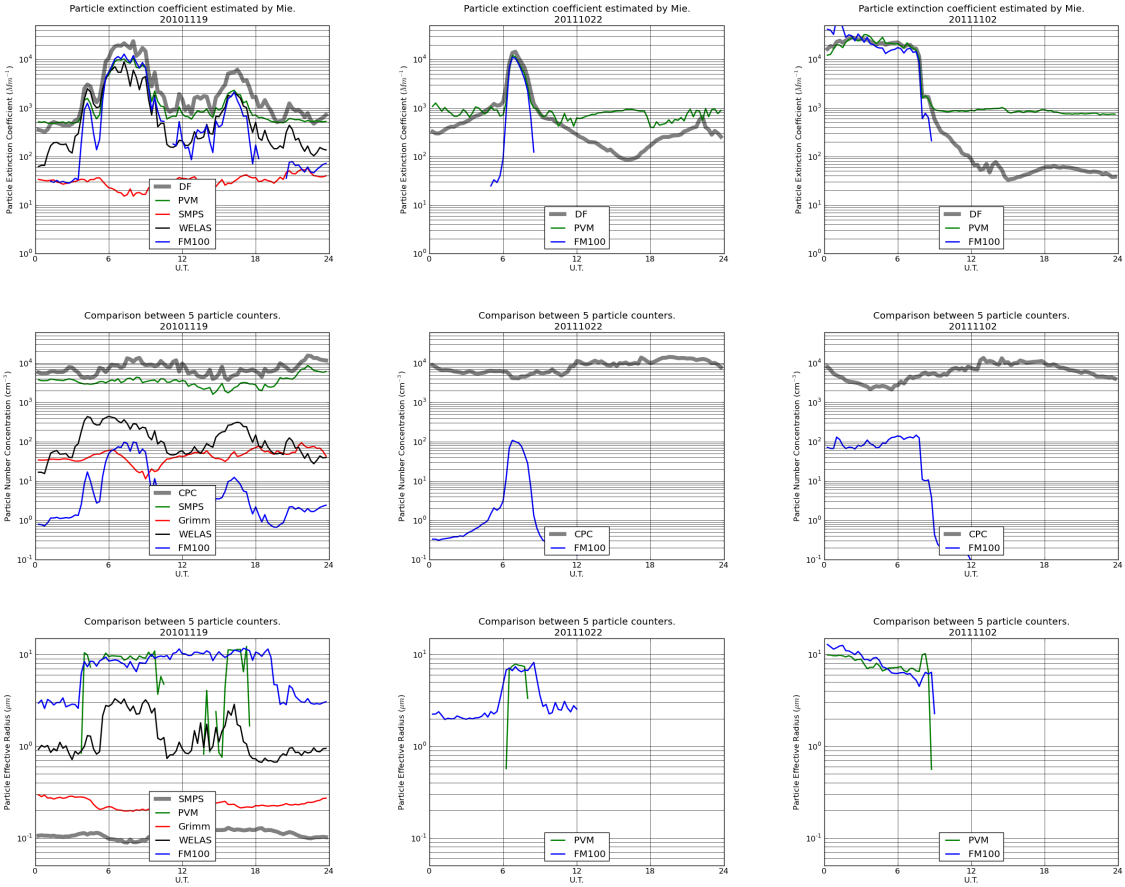

Figure 3. Comparison of several parameters derived from seven instruments (DF, PVM, CPC, SMPS, Grimm, WELAS and FM100), for the three 19/11/2010, 22/10/2011 and 02/11/2011 fog events: particle extinction coefficient (top row), particle number concentration (middle row) and particle effective radius (bottom row).

Such high values of lwc larger than 200 mg m^{-3}, measured in the beginning of this 2011-2012 season, were never measured in 2010-2011 (***Figure 4***) (212 mg m^{-3} on 30 November, according Fred, but at finer time resolution). The relation between lwc and per is not conserved between the two seasons, indeed for effective radius of 10 µm, lwc is larger in 2011-2012 than in 2010-2011.

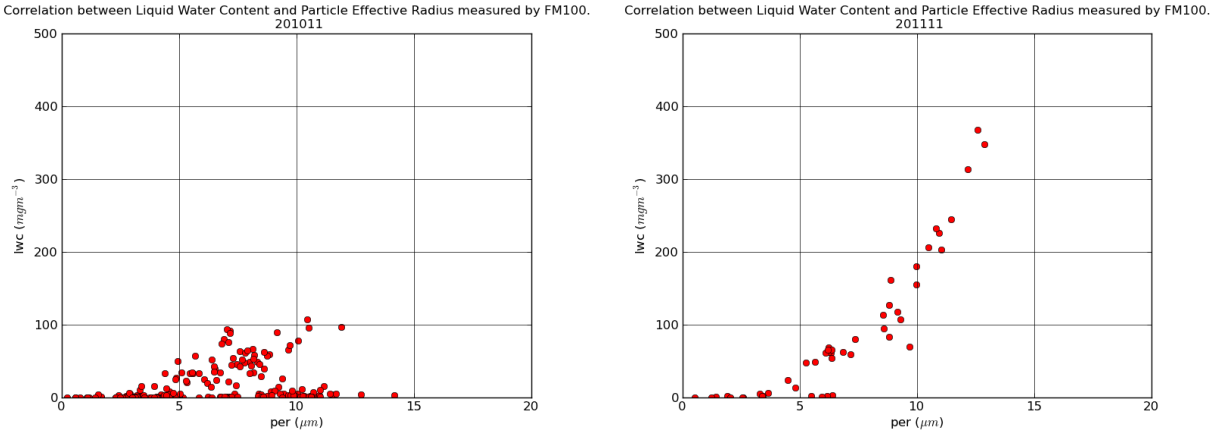

Figure 4. Correlation between lwc and per in November 2010 and 2011.