

## ***Interactive comment on “An investigation of nucleation events in a coastal urban environment in the Southern Hemisphere” by J. F. Mejía and L. Morawska***

**J. F. Mejía and L. Morawska**

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### General Comments:

The manuscript 8220;An investigation of nucleation events in a coastal urban environment in the Southern Hemisphere8221; by 8220;J.F. Mejía and L. Morawska8221; presented interesting data on new particle formation in Brisbane (Eastern Australia). The data itself is very interesting because it includes several periods (2-4 weeks each) in different seasons during 2006 and 2007.

While I do agree partly with the other Reviewers8217; comments, I see this require more analysis. One of the main issues here is to look further in the wind sector and find possible sources of air pollution. The authors did not mention that the Brisbane

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airport is located to the west of their sampling site and the effect is very clear in their data when the prevailing wind was from that direction.

I do encourage the authors to conduct more intensive wind-sector analysis for the particle concentrations and gases and find correlate that to the sources. In that case, averages are not useful. Instead making time series analysis and separating the effects based on high time-resolution would do so.

The main findings here are not only new particle formation, but what is more interesting to show other sources in the area. As the authors indicated, the new particle formation was rare they should explain the behaviour of aerosols at that measurement location.

Response:

The reviewer has correctly pointed out that the airport is located west to the site. In response, a new sentence was added between the sentences in page 2198, lines 13-15. In other words, the original text:

8220;An oil refinery is located in the south-western quadrant, with its closest point approximately 500 m from the sampling area. A seaport facility occupies most of the island, and is located approximately 1 km north of the site8221;

has been expanded as follows:

8220;An oil refinery is located in the south-western quadrant, with its closest point approximately 500 m from the sampling area. The mouth of the Brisbane River, on the west side of the sampling area, covers a width of approximately 4 km separating the site from the Brisbane airport and a small residential and industrial area. A seaport facility occupies most of the island, and is located approximately 1 km north of the site8221;.

The reviewer8217;s comment that the effect of the airport on the data when the wind originated from the western sector required careful examination. To discuss the effect of the airport on the data, a new paragraph was inserted to page 2205 between the

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paragraphs starting with 8220; There were a few events associated with wind blowing from the port and the refinery sectors, and none from the road 8230; 8221; (lines 7-16) and 8220; Even though the wind does not blow from the road during nucleation events, for all campaigns, the N14-30 peaked in the morning 8230; 8220; (lines 17-22). The inserted paragraph reads as follows:

8220; Figure 1 shows that the airport is located in the same sector as the road and therefore its influence on the data when the wind blew from this sector might appear clear at first glance. However, this effect was severely masked by the dominance of traffic emissions due to the much closer proximity between the road and sampling point. Furthermore, research has shown that particle number concentration and size distribution decrease with distance between the source and measurement location (e.g. Hitchins et al., 2000) and at about 300 m downwind from the source particle concentration is undistinguishable from background concentrations (Zhu et al., 2002a, 2002b). Since the airport was located at a much greater distance to the site, about 4 km, its contribution to the observed measurements when the wind blew from this sector was therefore negligible 8221;.

The last two paragraphs in the reviewer 8217; s comments are inter-related and therefore they require a single reply. As shown in Figure 1, apart from the airport, all the possible local sources were identified in the original manuscript (Section 2.1). Therefore, further wind-sector analysis was unnecessary.

The averages shown in Figures 2 and 3 were intended to explore the daily variation in particle number concentration. As shown in our response to reviewer 8217; s 1 (comments 4 and 5), the data was highly reliable and there the averages shown in Figures 2 and 3 are representative of the daily variation in particle number concentration in the study area.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 2195, 2009.