Geophysical Research Abstracts
Vol. 12, EGU2010-13988, 2010
EGU General Assembly 2010

Continental background in oceanic air masses and marine emission of Volatile Organic Compounds in Drake Passage

Aurélie Colomb (1), Rodolphe Paris (2), Rémi Losno (2), Karine Desboeufs (2), and Christine Provost (3)

(1) LaMP, Clermont Université, University Blaise Pascal, CNRS, Aubière, France (a.colomb@opgc.univ-bpclermont.fr), (2) LISA, Universités Paris 12 - Paris7, CNRS, Créteil, France, (3) LOCEAN, Université Pierre et Marie Curie, Paris, France

In Drake Passage, continental air masses are mixed with pure oceanic air masses, and are evolving through the circumpolar atmospheric circulation. The most probable origin of continental air is Australia and Patagonia. Atmospheric dust content and deposition rate is quite unknown in Austral region. Long term evolution of continental air over the ocean is only poorly known, even if the oceanic surface is more than 80% of the Southern Hemisphere. Recent field experiments have shown large differences between estimated and measured dust or deposition.
Dust particles can be carried up from the sources into the atmosphere for long range transport. Then, dust is deposited into the ocean surface. Dust deposition can bring micro-nutrients to the marine biota as trace metals and metalloids. During transport, some trace gases are oxidized depending on their lifetimes. It is therefore possible to calculate the photochemical age of the air masses, with some tracers of the long range transport and some tracers of sources origin.

The Southern Ocean is poorly characterized in term of organic compounds and trace gases. Numerous experiments have shown that marine biology, such as phytoplankton can emit volatile organic compounds (VOC) but few shipborne measurements have been performed to determine potential source or sink of selected species. Especially in austral region, recent campaigns (MANCHOT in Indian Austral Ocean in December 2004 (Colomb et al, 2009); OOMPH between Cape Town and Punta Arenas in January 2007) have shown the impact of oceanic emission on the local and global atmospheric chemistry.

During the ANT XXV-4 cruise on board the Polarstern in 2009, from Punta Arenas through Drake passage to Antarctic Peninsula, 165 air samples and 25 aerosol samples were collected, distributed all along the track. Additionally we took 4 rain samples to estimate the wet deposition. All the samples were taken at the front of the crow deck. Particles size and distribution and ozone concentration were also measured continuously.

Preliminary results of the campaign will be presented including:
- Relation between dust, trace gases and the photochemical age of the air mass,
- Dust deposition and the water soluble fraction of aerosol over the remote Austral ocean region,
- Atmospheric composition and trace gases emission from marine sources, or from continental sources after a long-range transport