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Gaseous elemental mercury and reactive gaseous mercury in coastal urban areas

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Mercury is both a global and a local pollutant. Anthropogenic emissions are found in the long lived form of gaseous elemental mercury (Hg(0)) and the short lived forms of reactive gaseous mercury (RGM) and particulate mercury. Bromine is believed to be the main oxidant of Hg(0) in the atmosphere. One source of bromine is release from sea spray above the ocean. The difference in meteorological conditions and chemical composition in the marine boundary layer compared to the terrestrial boundary layer combined with mercury emissions from coastal urban areas could cause a different pattern in speciation and deposition of mercury at the coast than seen at inland urban sites.

We want to investigate the impact of anthropogenic emissions on mercury concentrations in the immediate environment of coastal urban areas versus long range. This is done to better understand emission loads, speciation, and impact of mercury on air, soil, and water in urban areas.

We present results from short duration measurements of Hg(0) and RGM in 15 coastal cities and their marine boundary layer. A closer examination of 3-4 days continuous harbor measurements in three urban areas in the Southern Hemisphere (Sydney (Australia), Christchurch (New Zealand) and Valparaiso (Chile)) was carried out. The speciation and concentration patterns in urban areas close to the coast could be different from inland urban areas due to the effect of e.g. bromine atoms from MBL and high relative humidity at the coast, which is mixed with polluted air from the cities. The dynamics of the observations will be discussed.