Overview of Chemical and Physical Measurements at Lulin Atmospheric Background Station (LABS, 2,862m MSL) in Taiwan, East Asia Since 2006

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The Lulin Atmospheric Background Station (LABS) in Taiwan held its grand opening for operation on 13 April 2006. It is located at the Mt. Lulin (2,862 m MSL; 23° 28'07"N, 120°52'25"E) in central Taiwan. The LABS is unique because its location and altitude can enhance the global network of GAW (Global Atmosphere Watch) in the Southeast Asian region where no high-elevation baseline station is available. Our site is located between the GAW Waliguan station (3,810 m) in Tibetian plateau and Mauna Loa Observatory (3,397m) in Hawaii. Trajectory study indicates that this site provides us a great chance to observe a variety of air mass originated from contaminated or clear source regions, giving a distinctive contrast of atmospheric changes. Present continuous operations include precipitation chemistry, aerosol chemistry, trace gases (CO, O_3, CFCs, VOCs), mercury, atmospheric radiation, and meteorological variables. Till present time, the average concentrations of CO, O_3 and PM10 are about 121 ppb, 34 ppb and 10 μg m^{-3}, respectively. The average pH value of precipitation is 5.73. The average concentrations of mercury such as GEM, RGM and PHg are about 1.78 ng m^{-3}, 41.65 pg m^{-3} and 8.96 pg m^{-3}, respectively. The average aerosol optical depth is 0.101. The background concentrations of CO, O_3 and PM10 are estimated to be about 82 ppb, 28 ppb and 6 μg m^{-3}, respectively. About 32% of the days in a year can be defined to be polluted. Especially in March, the concentrations of above three pollutants show twice higher than their background values. To summarize the results, the maximum concentration of pollutants generally occurred during spring time, especially in March, corresponding to the biomass burning from SE Asia.

Figure 1. Lulin Atmospheric Background Station (LABS).