**Institute of Atmospheric Physics, National Central University**

**Master Seminar**

Date: 2017/05/12

Location: S1-713

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**Long term characterization of cloud water chemistry at Mt. Bamboo in Taiwan**

**Abstract**

Cloud water was collected on an hourly basis at Mt. Bamboo (~ 1,100 m MSL), northwest Taiwan during northeast monsoon seasons in 1996-2016. In total, 180 cloud events were observed with 6,489 samples collected. Long term average pH value is 4.1 for cloud samples and 4.4 for mixture (cloud and rain at the same time) samples, indicating high acidity of cloud. Next to sea-salt, nss (non sea salt)-SO42- and NO3- are major contributors of inorganic ions with average ion concentrations of 220 and 89 µeq *l*-1, respectively, and with average cloud loadings of 2.25 and 1.49 µg m-3, respectively, indicating the effect of East Asian pollution. Through 21-year, all major ions show slightly decreasing trends, among which nss-SO42- posts the strongest decreasing trend, reflecting the source emission reduction in China. HYSPLIT cluster analysis is applied for 11-year backward trajectories from 2006-2016, with 5 clusters presenting for different air mass pathways. Cloud loading shows lowest values when air mass comes from NE Asia and northern China, while highest values belong to Indochina and Central China sources. The results suggest the stronger impact of travel distance and pathway comparing to source region. Two case studies with extremely polluted cloud are analyzed using a combination of chemistry data, HYSPLIT trajectory, satellite observation and meteorology data. 2002/03/22-24 case evidences a mixture effect of China pollution, dust storm and biomass burning smoke. 2016/01/18-23 case show strong influence from China pollution, following up by rain-out effect. Further discussion will be presented.

**Keywords:** nitrate, sulfate