A Big Earth Data Platform for Three Poles

**The dataset of atmospheric chemical composition in Namcu and Muztagh Ata (2005-2009)**

1、Description

The data include three data sets of Namcu and Muztagh Ata: an atmospheric aerosol data set of monthly average values of TSP, lithium, sodium and other elements; an atmospheric precipitation chemical data set of monthly average values of soluble sodium ions, potassium ions, magnesium ions, calcium ions and other ions; and a data set of chemical compositions of snow ice in the Zhadang Glacier of Namcu Basin of the concentrations of soluble sodium ions, potassium ions, magnesium ions, calcium ions and other ions in snow pits collected in different months. The data can be used in conducting located observations of atmospheric aerosol element content, precipitation chemistry, and glacier snow ice chemical records in the Namco and Muztagh Ata areas.
The samples were processed at the Key Laboratory of Tibetan Environment Changes and Land Surface Processes of CAS using ICS2500 and ICS2000 ion-chromatographic analyzers to determine the concentration of soluble anions and cations in the samples.
Data collection and processing:
1. The automatic rain gauges were erected in the typical regions of the Tibetan Plateau (the Namco Basin and the Muztagh Ata Peak area) to collect precipitation samples. The precipitation samples were collected using a SYC-2 type rainfall sampler that comprised a collector, rain sensor and gland drive. The sample collector was provided with a rain collection bucket and a dust collection bucket, and the weather condition was sensed by the rain sensor. The rain collection bucket would be opened when it started to rain, and the gland would be pressed onto the dust collection bucket. Meanwhile, the date and the rain start and end times were automatically recorded. When the rain stopped, the gland automatically flipped to the rain collection bucket to complete a rainfall record. The collected samples were placed in 20 mL clean high-density polyethylene plastic bottles and refrigerated in a -20 °C refrigerator. They were frozen during transportation and storage until right before being analyzed, when they would be taken from the refrigerator and thawed at room temperature (20 °C). They were then processed at the Key Laboratory of Tibetan Environment Changes and Land Surface Processes CAS using ICS2500 and ICS2000 ion-chromatographic analyzers to determine the concentration of soluble anions and cations in the precipitation.
2. The atmospheric aerosol sampler installed at Namco Station was 4 m above the ground and included a vacuum pump, which was powered by solar panels and batteries. The air flux was recorded by an automatic flow meter, and the instantaneous flow rate was approximately 16.7 L/min. The air flux took the meteorological parameter conversion of the Namco area as the standard volume. A Teflon filter with a diameter of 47 mm and a pore size of 0.4 & mu; m was used. The sample interval was 7 days, and the total sample flow rate of each sample was approximately 120-150 m³. Each sample was individually placed in a disposable filter cartridge and stored at low temperature in a refrigerator. Before and after sampling, the filter was placed in a constant temperature (20 ± 5 °C) and constant humidity (40 & plusmn; 2%) environment for 48 hours and weighed with a 1/10000 electronic balance (AUW220D, Shimadu); the difference between the weights before and after was the weight of the aerosol sample on the filter. The collected samples were processed at the Key Laboratory of Tibetan Environment Changes and Land Surface Processes CAS by ICP-MS to determine the concentrations of 18 elements. Strict measures were taken during indoor and outdoor operations to prevent possible contamination.
3. A precleaned plastic shovel was used to collect a sample every 5 cm from the lower part of the snow pit (samples were collected every 10 cm in some snow pits). The samples were dissolved at room temperature, placed in 20 mL clean high-density polyethylene plastic bottles and stored in a refrigerator at -20 °C. The samples were frozen during transportation and storage until they were taken out of the refrigerator before the analysis and melted at room temperature. The samples were processed at the Key Laboratory of Tibetan Environment Changes and Land Surface Processes CAS using ICS2500 and ICS2000 ion-chromatographic analyzers to determine the concentrations of soluble anions and cations in the samples. Clean clothing, disposable masks and plastic gloves should be worn during the manual collection of glacier snow ice chemical samples to prevent contamination.
The data set was processed by forming a continuous sequence of monthly mean values after the raw data were quality controlled. It meets the accuracy of routine monitoring research on precipitation, aerosol, snow and ice records in China and the world and is satisfactory for comparative study with relevant climate change records.

2、Keywords

Theme：Precipitation,Snow,Aerosol,Glacier(Ice Sheet),Atmospheric Trace Gase
Discipline：Atmosphere,Cryosphere
Places：Tibet, Muztagh Ata, Namco
Time：

3、Data details

1.Scale：None

2.Projection：

3.Filesize：15.86MB

4.Data format：EXCEL

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.0 | - |
| west：75.0 | - | east：90.0 |
| - | south：30.0 | - |

5、Time frame:2005-01-10 08:00:00+00:00--2010-01-09 08:00:00+00:00

6、Reference method

References to data:

KANG Shichang. The dataset of atmospheric chemical composition in Namcu and Muztagh Ata (2005-2009). A Big Earth Data Platform for Three Poles, doi:10.11888/AtmosphericEnvironment.tpe.91.db2018

References to articles:

Cong, Z.Y., Kang, S.C., Smirnov, A., Holben, B. . Aerosol optical properties at Nam Co, a remote site in central Tibetan Plateau. Atmospheric Research, 2009, 92, 42-48.

Zhang, Y.L., Kang, S.C., Zhang, Q.G., Cong, Z.Y., Zhang, Y.J., &Gao, T. (2010). Seasonal and spatial variability of microparticles in snowpack on the Tibetan Plateau. Journal of Mountain Science, 7(1), 15-25.

2.Li C., \*S. Kang, Q. Zhan, S. Kaspari, 2007. Major ionic composition of precipitation in the Nam Co region, Central Tibetan Plateau. Atmospheric Research, 85(3-4): 351-360. Doi: 10.1016/j.atmosres.2007.02.006.

3.Kang S., J. Huang, Y. Xu, Changes in ionic concentrations and &18O in the snowpack of Zhadang Glacier, Nyainqentanglha mountain, Southern Tibetan Plateau. Annals of Glaciology, 49, 127-134.

徐彦伟, 康世昌, 周石硚, 丛志远, 迟妍妍, & 张强弓. (2007). 青藏高原纳木错流域夏、秋季大气降水中δ18o与水汽来源及温度的关系. 地理科学, 27(5).

7、Supporting project information

8、Data resource provider

name: KANG Shichang
unit: Institute of Tibetan Plateau Research, CAS
email: kangsc@itpccas.ac.cn