A Big Earth Data Platform for Three Poles

**Dataset of near-surface air temperature lapse rates in the mainland China (1962-2011)**

1、Description

Land surface hydrological modeling is sensitive to near-surface air temperature, which is especially true for the cryosphere. The lapse rate of near-surface air temperature is a critical parameter when interpolating air temperature from station data to gridded cells. To obtain spatially distributed, fine-resolution near-surface (2 m) air temperature in the mainland China, monthly air temperature from 553 Chinese national meteorological stations (with continuous data from 1962 to 2011) are divided into 24 regional groups to analyze spatiotemporal variations of lapse rate in relation to surface air temperature and relative humidity.  
  
The results are as follows: (1) Evaluation of estimated lapse rate shows that the estimates are reasonable and useful for temperature-related analyses and modeling studies. (2) Lapse rates generally have a banded spatial distribution from southeast to northwest, with relatively large values on the Tibetan Plateau and in northeast China. The greatest spatial variability is in winter with a range of 0.3°C–0.9°C / 100m, accompanied by an inversion phenomenon in the northern Xinjiang Province. In addition, the lapse rates show a clear seasonal cycle. (3) The lapse rates maintain a consistently positive correlation with temperature in all seasons, and these correlations are more prevalent in the north and east. The lapse rates exhibit a negative relationship with relative humidity in all seasons, especially in the east. (4) Substantial regional differences in temporal lapse rate trends over the study period are identified. Increasing lapse rates are more pronounced in northern China, and decreasing trends are found in southwest China, which are more notable in winter. An overall increase of air temperature and regional variation of relative humidity together influenced the change of lapse rate.  
  
The dataset is represented in an Execel document, the annual and seasonal air temperate lapse rates are included.

2、Keywords

Theme：2m temperature,Temperature,Surface air temperature declining rate,Near surface temperature  
Discipline：Atmosphere  
Places：China  
Time：

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：5.1MB

4.Data format：Excel

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：53.0 | - |
| west：73.0 | - | east：134.0 |
| - | south：21.0 | - |

5、Time frame:1962-01-07 08:00:00+00:00--2012-01-06 08:00:00+00:00

6、Reference method

References to data:

WANG Lei. Dataset of near-surface air temperature lapse rates in the mainland China (1962-2011). A Big Earth Data Platform for Three Poles, doi:10.3972/westdc.003.2014.db2014

References to articles:

Li, X., Wang, L., Chen, D., Yang, K., Xue, B., & Sun, L. ( 2013), Near‐surface air temperature lapse rates in the mainland China during 1962–2011, Journal of Geophysical Research-Atmospheres, 118(14), 7505– 7515, doi:10.1002/jgrd.50553.

7、Supporting project information

8、Data resource provider

name: WANG Lei  
unit: Institute of Tibetan Plateau Research,Chinese Academy of Sciences  
email: wanglei@itpcas.ac.cn