A Big Earth Data Platform for Three Poles

**Thermal contrast index (TCI) between the Tibetan Plateau and the Indian Ocean (1979-2018)**

1、Description

The land-sea thermal contrast is an important driver for monsoon interannual and interdecadal variability and the monsoon onset. The importance of the thermal contrast between the Tibetan Plateau (TP) and the Indian Ocean (IO) in driving the establishment of Indian Summer Monsoon (ISM) has been recognized. The South Asian Summer Monsoon (SASM) is primarily a tropical summer monsoon. As a direct dynamic response to the diabatic heating, the difference between upper and lower-layer winds can be closely linked to the strength of the heat source. The upper-layer thermal contrast is more important for the SASM (Sun et al., 2010; Sun and Ding，2011; Dai et al., 2013). Thermal contrast between the TP and the IO at the mid-upper troposphere is closely related to the onset and the variability of ISM. Considering that the temperature above the TP and IO are the two centers which are most sensitive to the change of ISM, a thermal contrast index (TCI) is proposed based on 500-200hPa air temperature:
TCI = Nor[T(25°N-38°N, 65°E-95°E) - T(5°S-8°N, 65°E-95°E)]
Where Nor represents standardization and T is 500-200hPa air temperature. The TCI is larger, and the ISM is stronger.
The TCI can capture the interannual and interdecadal variability of ISM well. The cooperative thermal effect between TP and IO may contributes more to the ISM than the separately temperature of TP or IO. In addition, from the view of climate mean state, the pentad-by-pentad increment of TCI has a 15-pentad lead when the correlation coefficient between it and the ISM index reaches the maximum. And the correlation coefficient between the pentad-by-pentad increment of TCI and the ISM index is significant when the pentad-by-pentad increment of TCI has a 3-pentad lead. The result indicates the advantage of the TCI for prediction of the ISM. Meanwhile, the averaged pentad-by-pentad increment of TCI for the first 25 (TCI25) pentads may be a predictor of the early or late onset of the ISM. The ISM onset will be earlier when the TCI25 is larger.

2、Keywords

Theme：Monsoon,Precipitation,Temperature,Atmospheric Water Vapor
Discipline：Atmosphere
Places：Tibetan Plateau, South Asia, The third pole, Indian Ocean
Time：1979-2018, Month, Pentad, Season, Summer

3、Data details

1.Scale：None

2.Projection：

3.Filesize：0.047MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.0 | - |
| west：65.0 | - | east：95.0 |
| - | south：5.0 | - |

5、Time frame:1979-01-10 08:00:00+00:00--2019-01-09 19:59:59+00:00

6、Reference method

References to data:

ZHAO Liang, XIAO Ziniu, LI Zhangqun. Thermal contrast index (TCI) between the Tibetan Plateau and the Indian Ocean (1979-2018). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2710172019

References to articles:

7、Supporting project information

Pan-Third Pole Environment Study for a Green Silk Road-A CAS Strategic Priority A Program

8、Data resource provider

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