

The Response of Snow on Tibetan Plateau in Winter to Indian Ocean Sea Surface Temperature Anomaly

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By using the daily snow depth and snow cover days data at 100 meteorological stations in Tibetan Plateau during 1979-2013, the methods of EOF, REOF and SVD were used to analyze the distribution characteristic and time series variation of snow in Tibetan Plateau. The coupling relationship between snow in Tibetan Plateau in winter and Indian Ocean sea surface temperature in winter, and the lag response of the snow in Tibetan Plateau in winter to Indian Ocean sea surface temperature were also studied. Main conclusions are as follows:

1. Snow depth and snow cover reaches the maximum value in January and reaches the minimum value in July; accumulated snow depth and snow cover days shows an increasing tendency during 1980s to 1990s and has a decreasing tendency since then. The accumulated snow depth and snow cover days decrease in summer and increase in autumn.
2. There were 4 high-frequency centers of snow cover days and accumulated snow depth: the southern Himalayas area, the area between the Tanggula Mountains and the Nyainqntanglha Mountains, the area around Bayankela Mountains and the area around Qilian Mountains.
3. The first pattern of SVD between snow in Tibetan Plateau in winter and Indian Ocean sea surface temperature in winter has the feature that Indian Ocean sea surface temperature increase in the whole area and snow has an opposite trend in the western and southeastern Plateau and the northern and southern Plateau. The second pattern shows that Indian Ocean sea surface temperature has an opposite trend in the western ocean and the eastern ocean and snow has an opposite trend in the western Plateau and the southeastern Plateau. There is a significant negative correlation between Indian Ocean sea surface temperature in June and July and snow in Tibetan Plateau in winter.

Key words: Tibetan Plateau; snow; Indian Ocean; SVD

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