Regional and seasonal variations of climatological lightning frequency over Asian-Australian monsoon region observed by TRMM-LIS

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In the present study, by utilizing 10-year (1998-2007) product of TRMM Lightning Imaging Sensor (LIS) data and precipitation data, we explored regional and seasonal variations of climatological lightning frequency over Asian-Australian monsoon region in monthly and 10-day basis. Several high frequency lightning regions are detected in northeastern Pakistan and northern Bangladesh, and on the Malacca Strait. The last place is a peculiar place, since most of other high frequency areas are located over the land. There are some secondary peaks in the eastern Indochina Peninsular, southern India, and northwestern Australia. Although they are, in general, located in the relatively high precipitation areas, their peak locations and period are not exactly coincide.
Lightning in Malacca Strait occurs almost all over the year, and its frequency has a weak peak in boreal spring. That in northern Bangladesh and northeastern Pakistan has a rather sharp annual peak in April-May, and July-August, respectively. It is interesting to note that the peak lightning activities occur in northern Bangladesh in pre-monsoon season, while those in northeastern Pakistan are corresponding to the peak period of South Asian summer monsoon. Although less frequent, that in northwestern Australia occur in both pre-monsoon and peak monsoon seasons.
As such, the relationship between the high lightning occurrence period and monsoon season has regional diversity.

Keywords: summer monsoon; pre-monsoon; peak monsoon; lightning