

Onset and withdrawal dates of rainy season in Central Highlands, Vietnam: Change, variation and predictability

Tan PHAN-Van¹, Ha PHAM-Thanh¹, Quang NGUYEN-Dang²

Email: phanvantan@hus.edu.vn

¹Department of Meteorology and Climate Change, VNU Hanoi University of Science

²National Center for Hydro-Meteorological Forecast

Hanoi, 100000, Vietnam

In this study, using the observed daily rainfall data from available meteorological stations during the period 1981-2014, the rainfall regimes over Central Highlands (CH) of Vietnam were investigated, which includes changes in monthly and agricultural weekly rainfall amount, changes in onset and end date of rainy season, outbreak of rainfall in dry season and intermittence of rainfall in wet season. The obtained results showed that:

1) Rainfall has an increased trend in almost all CH region in the late months of dry season (March, April). In the early months of the dry season, the trends in rainfall were significantly different between the north and south CH. Specifically, in the north CH, rainfall has slightly decreased or remains unchanged, while it has increased strongly over the south CH, especially in November. In other months, the trends of rainfall over the CH revealed a mixture between increased trend (July, September) and decreased trend (June, August, October). This maybe a signal of the increase of rainy intermittence during the wet season, or a seasonal shifting.

2) The onset date of the rainy season in CH varies widely from year to year. Spatially, the onset firstly starts at the south CH and then spreads to the north CH. The earliest onset date is around the middle of March (73th-75th day), and latest in the middle of May (130th-135th day). The rainy season onset is earlier than the summer monsoon onset by about three weeks, average is on 109th day (19 April), with standard deviation of 16-17 days, i.e the rainy season starts between early April to early May. The end date of the rainy season is about the end of October (298th-305th day, i.e 25th October to 1st November), average is on 302th day (29th October), with earliest day is about 265th-278th day (22nd September to 5th October), and the latest is about 334th-345th day (30th November to 11th December).

3) The trend of the rainy season onset date is about 2 days/decade earlier over entire CH, 4 days/decade earlier in the south CH, 2-3 days/decade earlier in the north CH, and no significant trend in mid CH. The trend of end date of the rainy season is about 3 days/decade earlier in mid CH and 3 days/decade later in the south CH. In mid CH, the rainy season seems to withdraw earlier, however the trend may not be significant.

4) In general, the rainy season in the CH has trends of earlier starting and earlier ending at about 2-4 days/decade. That means it may be a seasonal shifting of the rainy season. The duration of the rainy season tends to be longer in the south and shorter in the mid CH

sub-regions. The number of days with daily rainfall exceeding 10mm/day during the dry season (15th November to 30th April) in CH has a large annual variation. There are no significant trends in the north and mid CH sub-regions, except Kon Tum and Buon Ma Thuot, where slightly increased trends have been observed at values of about 0.4 day/decade and 0.9 day/decade, respectively. These events also have an increased trend in the south CH with values of about 2 days/decade. The number of intermittent rainfall events during the rainy season in CH is about 4-7 spells/year. The number of the events also has a significant annual variation with a light increased trend.

In addition, the investigation of statistical relationships between onset date of rainy season in CH (predictand) and large-scale variables (predictors) was also carried out in this study. Based on that, the potential seasonal predictability of the rainy season onset date in CH was examined.