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A new methodology to identify important dates in the Western North Pacific Summer Monsoon seasonal evolution.

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A new approach to identify the breaks of the Western North Pacific Summer Monsoon (WNPSM) is presented in this study. The novelty of this method is the exclusive use of wind direction observations taken aboard sailing ships and stored on the International Comprehensive Ocean-Atmosphere Data Set (ICOADS) for that purpose. This made it possible, for the first time, to compute the climatology of the WNPSM breaks at daily scale since 1949 and up to the present day. It is usual to find one or two breaks per season, representing the 38% and 24% out of the cases, respectively. The most frequent dates for breaks to occur are from August to early September, although it is common to detect breaks between late-June and mid-July as well. Regarding its length, more than the 75% of the WNPSM breaks lasted between 15 and 30 days.

In addition, it was possible to identify the onset and withdrawal dates of the WNPSM. The onset date series shows high interannual variability, ranging between early-May and early-August. Nevertheless, the withdrawal of the WNPSM is lesser variable and tends to occur by mid-October. On the other hand, the well-known relationship between the WNPSM dates and the ENSO in the last decades has been confirmed. The WNPSM tends to start sooner (later) and finish later (sooner) with La Niña (El Niño) conditions. Nevertheless, this relationship weakened before the 1980s.

Finally, as the Western North Pacific is a region with a high tropical cyclone (TC) activity, we assessed the influence of the WNPSM breaks on the TC tracks. TC trajectories tended to pass through northern Philippines towards Indochina Peninsula and southeastern China in active monsoon days, whereas they were recurved to higher latitudes, mainly to Korea and Japan, during break spells.

It must be emphasised that due to present-day data limitations our study currently spans the period 1949-2014. However, it is thought that there are still thousands of earlier wind direction observations taken aboard ships not yet digitised. Our methodology would be directly applicable to these data and could help to extend the knowledge about the intraseasonal characteristics of the monsoon back in time.

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