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Multi-scale approach of the onset of the rainy season over Sudano-Sahelian belt: spatial coherence and potential predictability.

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The spatial coherence of boreal monsoon onset (July-September) over the western and central Sahel is studied through the analysis of daily rainfall records for 136 rain-gauges from 1950-2000. Onset of the rainy season has been defined using 3 definitions which rely on 3 overlapped spatial scales: (i) the regional scale, i.e. the northward ITCZ jump from Guinean to Soudano-Sahelian latitudes, (ii) the meso-scale related with the first occurrence of the main rainfall-generating phenomenon, that is squall line and (iii) the local-scale of the first rainfall recorded at the rain-gauge. Local and meso-scale onsets show a weak degree of instantaneous and inter-annual spatial coherence, meaning that onset is almost never simultaneously recorded across a regional network but also that its inter-annual variability is not in-phase across such area. In consequence, the seasonal predictability of the monsoon onset coming from planetary and zonal sea surface temperature variations is weak.