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Do subseasonal forecasts take advantage of windows of opportunity related to a precursor phenomenon?

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This study proposes an objective methodology to highlight windows of opportunity related to a precursor phenomenon in a numerical subseasonal forecasting system. The methodology is based on a contingency table and is illustrated with the relationship between the Madden-Julian oscillation (MJO) and heavy rainfall in the tropical band. As a slowly propagating signal of enhanced convection, the MJO may indicate favorable conditions for heavy precipitation a few weeks ahead in some tropical areas. The combined knowledge of these climatological impacts and the current phase of the MJO at initialization defines observation-based "climatological windows of opportunity". In a second step, we analyze whether S2S forecasts are indeed more performant when there is increased climatological likelihood of heavy rainfall, i.e whether the forecasts convert "climatological windows of opportunity" into "model windows of opportunity".

The methodology is implemented to the prediction of the upper quintile of weekly precipitation in 20 years of ECMWF S2S reforecasts in the November-to-April season. The ability of the ECMWF forecasts to convert periods with more predictable events into periods of actual forecast skill is only verified for a limited number of small areas, while failures to seize the opportunities lie in misplaced MJO impacts, signal loss or too many false alarms.