SESSION: (A2) Modelling issues in S2S prediction

(A2-07)

Mean state bias, cloud-radiation feedbacks, and MJO prediction skill in the S2S models

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The Madden-Julian Oscillation (MJO), the dominant mode of tropical intraseasonal variability, provides a major source of tropical and extratropical predictability on subseasonal timescale. We examined the relationship of MJO prediction skill with biases in the column water mean state and longwave cloud-radiation feedbacks in the models participating in subseasonal- to-seasonal (S2S) prediction project. In most S2S models, a notable dry bias develops within a few days of forecast lead time in the deep tropics, especially across the Maritime Continent. The dry bias weakens the horizontal moisture gradient over the Indian Ocean and western Pacific, likely dampening the organization and propagation of the MJO. Most S2S models also underestimate the longwave cloud-radiation feedbacks in the tropics, which may affect the maintenance of the MJO convective envelope. The models with smaller bias in the mean horizontal moisture gradient and the longwave cloud-radiation feedbacks show higher MJO prediction skills, suggesting that improving those biases would enhance MJO prediction skill of the operational models.