Tropical Atlantic influence on South Asian monsoon and Indo-Pacific region

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The tropical Atlantic has surprisingly strong and robust impacts on the South Asian monsoon and on the Indo-Pacific region in general. In this presentation recent observational and model-based findings will be reviewed. It is shown that responses to a tropical Atlantic sea surface temperature (SST)-induced heating anomaly leads to a Gill-type adjustment of the atmospheric circulat.ion and to a modification of the global tropical Walker Circulation. These adjustments lead to several influences in the Indo-Pacific region. For the South Asian monsoon the Gill-type response to a positive tropical Atlantic heating anomaly leads to a weakening of the Somali Jet and to a low-level high pressure in the Arabian and Indian region, both inducing negative rainfall anomalies. In the Pacific region westerly surface wind anomalies are induced in the central-western Pacific region, triggering oceanic kelvin waves with eventually lead to a La Nina several month later. At multidecadal time-scales the tropical branch of the Atlantic Multidecadal Oscillation pattern induces also a La Nina like Pacifc response in the eastern Pacific, and basically governs the long-term variability of SSTs in the tropical western Pacific. Here a subtropical North Pacifc bridge mechnisms including wind-evaporation and a positive SST-SLP-longwave radiation feedback play crucial roles. It is also demonstrated with simplified Atmospheric General Circulation (AGCM) aquaplanet simulations that the discussed atmospheric responses are consistent with the basic dynamical adjustment to a localized equatorial heating anomaly.