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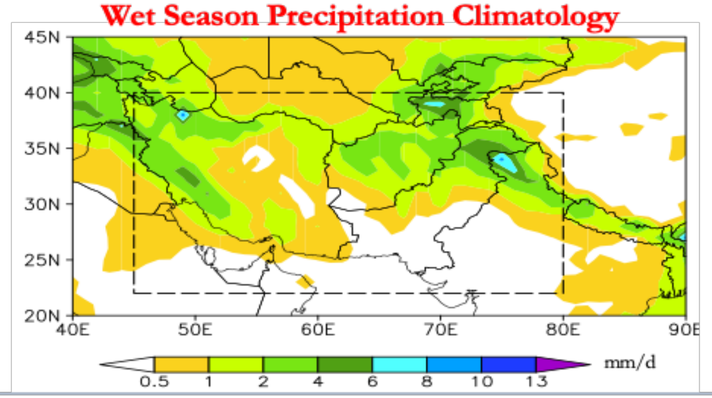
Indian Ocean mediates the ENSO teleconnections to the Central Southwest Asia during the wet season

M. Adnan Abid[1] (mabid@ictp.it); Moet. Ashfaq[2]; F. Kucharski[1]. K. J. Evans[2]; M. Almazroui[3]

1) International Centre for theoretical Physics (ICTP), Trieste, Italy; 2) Oak Ridge National Laboratory (ORNL), US; 3) Centre of Excellence for Climate Change Research (CECCR), KAU, Jeddah, Saudi Arabia

1- MOTIVATION

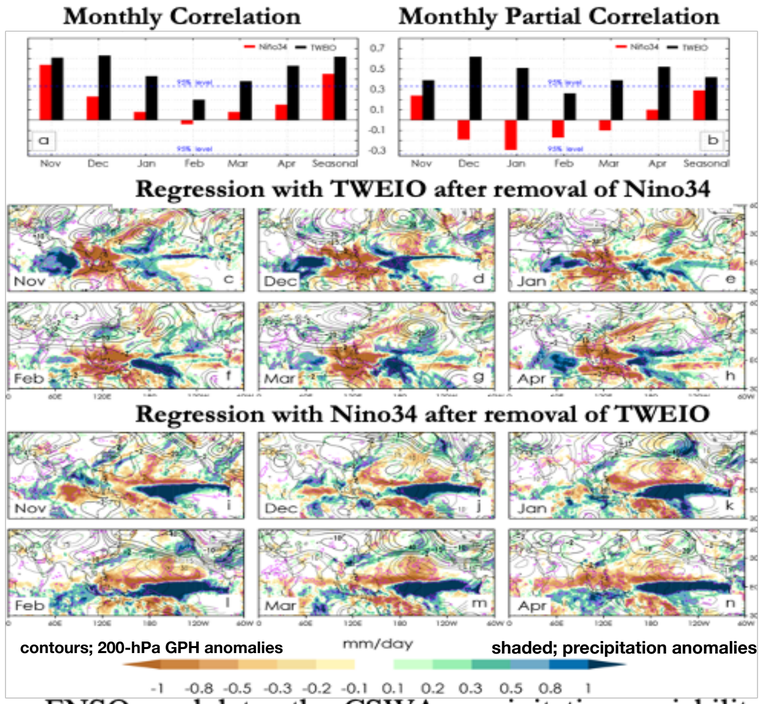
Central-Southwest Asia (CSWA) is a unique region that contains high mountains in its north and desert in its south and receives precipitation from (Nov-Apr) also known as wet season. It is important to understand the El Niño-Southern Oscillation (ENSO) teleconnections and the role of Indian Ocean in the CSWA hydroclimate variability.



2- DATASET, METHODOLOGY, MODEL

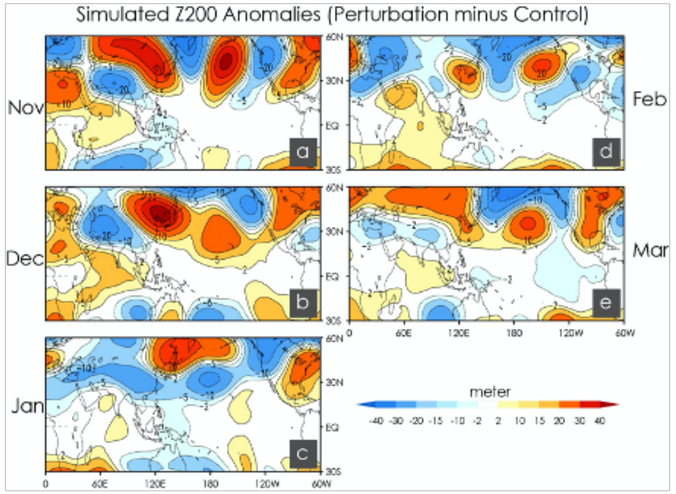
- Fifth Generation European Reanalysis dataset (ERA 5) was used for the period 1981-2018.
- ICTP-Atmospheric Global Climate Model (SPEEDY) was used to investigate the role of the tropical Indian Ocean in the ENSO teleconnection to the CSWA precipitation.
- Partial regression method was used to isolate the influence of the tropical forcing from each other.

3- INTRASEASONALITY OF THE ENSO TELECONNECTIONS



- ENSO modulates the CSWA precipitation variability through subtropical westerly jet during early and late wet season, while a minimum influence is in the middle of the season. However, Tropical western-eastern Indian Ocean (TWEIO) index shows consistent signal.
- Separating tropical forcing shows that ENSO influence the CSWA precipitation variability through the Indian Ocean.

4- MODEL EXPERIMENTATION



- Indian Ocean heating dipole (TWEIO) anomalies forced pattern simulated the 200-hPa Geopotential height anomalies (GPH) response reasonably well during wet season, which modulates CSWA precipitation variability.

5- SUMMARY

- Seasonal Predictability can be improved with detail understanding of the ENSO teleconnections. We noted intra-seasonality of the ENSO teleconnections, which limits the regional precipitation predictability over the CSWA region.
- The tropical inter-basin interactions is a useful framework to understand the ENSO teleconnections.

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For details: Abid et al. 2020; GRL (https://doi.org/10.1029/2020GL089308)