Decadal signal of temperature to hiatus over Tibet Plateau

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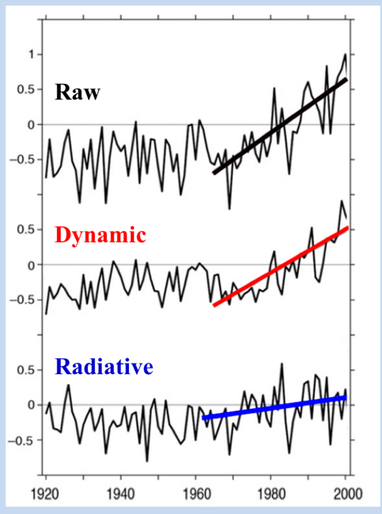
Abstract

- **Under global warming, the Tibet Plateau experienced an continuous warming in boreal winter warming trend in past decades**
- **Such obvious warming is greatly dominated by local radiative factors, such as the CO2, black carbon and others; dynamic effect from NAO, PDO and AMO are much weaker over Tibet Plateau**

Method and Data

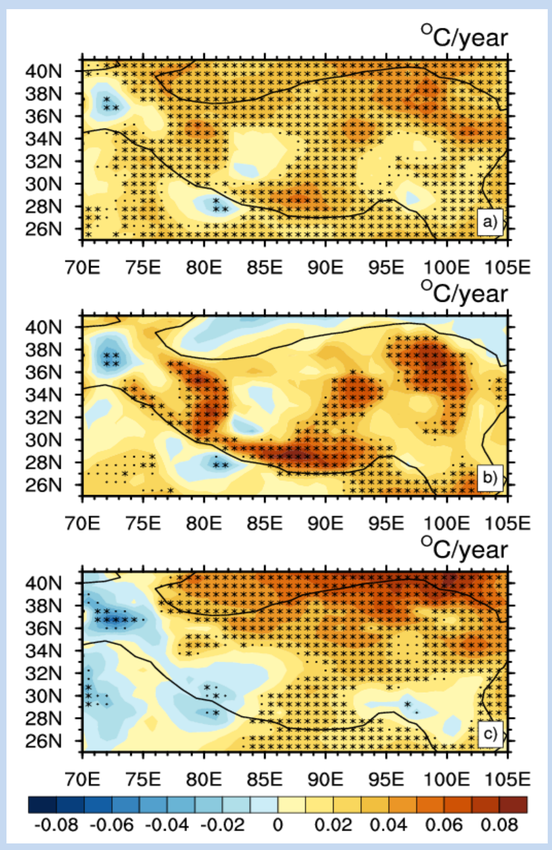


$$T_{raw}=T_{dynamical}+T_{radiative}$$

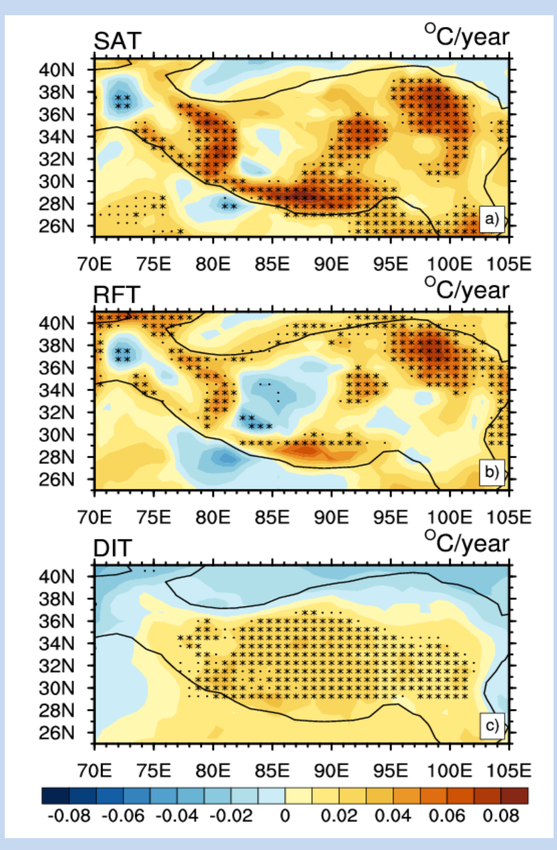
(1) Temperature is the ERA-Interim from 1979-2012 with the spatial resolution of 0.75°×0.75° .

(2) Sea Level Pressure (SLP) is from the National Oceanic and Atmospheric Administration (NOAA), which has a spatial resolution. of 2° × 2° for the period 1979-2012

Decadal variability of temperature

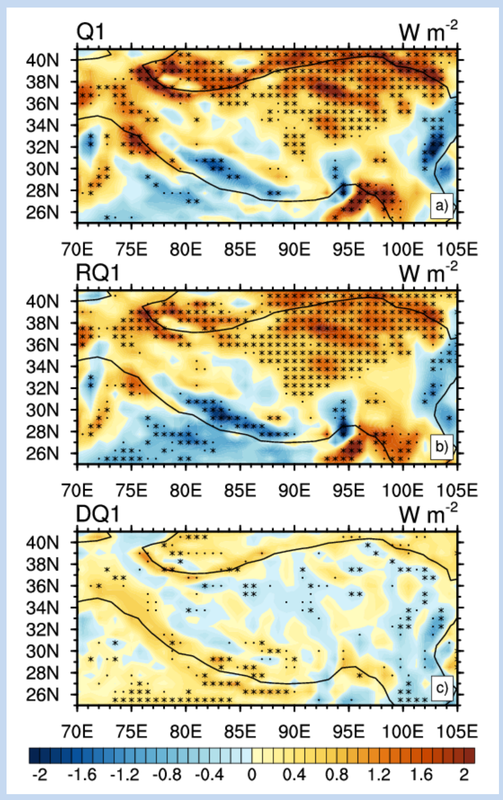


Trend distribution of air temperature during 1980-2015 (a) annual, (b) cold season, (c) warm Season

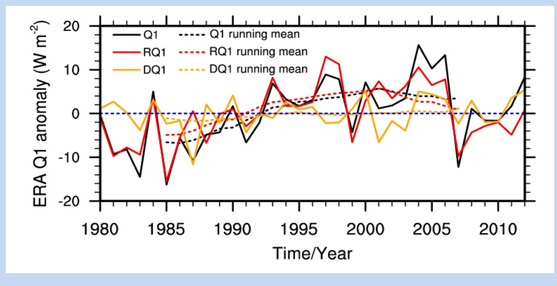


Trend distribution of air temperature during 1980-2015 in cold season (a) raw, (b) RFT, (c) DIT

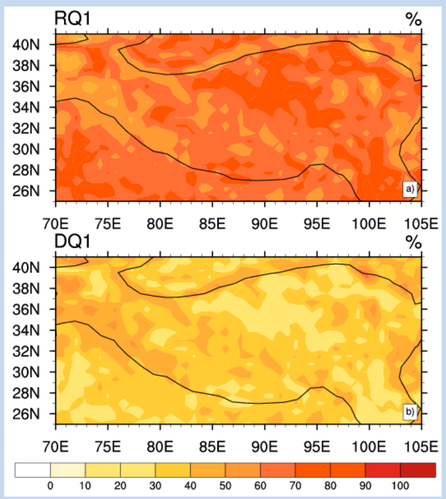
Variability of heat source



Trend distribution of air heat during 1980-2015 in cold season (a) raw, (b) RFT, (c) DIT



Time series of air heat during 1980-2015 in cold season



Contribution of RQ and DQ to raw heat source during 1980-2015 in cold season

- The surface air temperature increased in most areas over the TP during the period of 1980-2012, particularly in the hiatus decade compared to the previous decade.
- The continuous warming in the TP was a result of uniform DIT warming over a large scale and enhanced RFT warming at a regional scale.
- An obvious warming in the TP is majorly induced by the CO2 warming effect, and BC exhibits an amplifying effect on the warming at high elevation.

References

- **Huang J*, Guan X, Ji F (2012) Enhanced cold-season warming in semi-arid regions. Atmos Chem Phys 12:5391–5398. doi: 10.5194/acp-12-5391-2012**
- **Ma, J., Guan, X.*, Guo, R., Gan, Z., & Xie, Y. (2017). Mechanism of non-appearance of hiatus in Tibetan Plateau. Scientific Reports, 7.**

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