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Title: Role of the Tibetan Plateau Thermal and Mechanical Forcing in the Su Climate Patterns over subtropical Asia

Abstract:

Numerical simulations by using IAP/LASG GOALS climate model and data analysis are carried out to investigate how the Tibetan Plateau (orography, sensible heating, as well as latent heating affect the sumn circulation and climate patterns over the subtropical Asia. It is shown the TP thermal effect, which is mainly depended on the monsoon precipitation induced latent heat release, is dominant in summer seas combination of the surface sensible heating and upper-level latent he results in air flows toward the midst of the TP and converges there, th generates a low-level cyclonic circulation around the TP and a anticyc circulation above it. However, comparing to the thermal aspect, the p mechanical forcing of the orography plays a reversed role in the circu pattern over the TP. According to the steady barotropic vorticity equa large-scale, airflows must converge in the low layers and diverge in th layers over the east side of TP. However, the west side of TP is charac by a reversed structure, i.e., divergence in low layers but convergenc high layers. Hence pumping and sucking processes result in upward a downward movement over the east and west side of TP, respectively. Moreover, in lower layers, Sverdrup vorticity balance implies equatorv flow in the descent region and poleward flow in the ascent region. Th opposition of circulation and vertical motion induced by the heating e the TP therefore generate the basic climate pattern, which is characte by wet in east flank but droughty in west flank of the plateau, in sum subtropical Asia. Such configurations are modified to some extent by diabatic heating and orography.

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