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## Static Stability Associated with Southern Hemisphere Blocking Onsets

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The horizontal and temporal variation of static stability prior to blocking onset is characterized through composite analysis of blocking events in the Southern Hemisphere. It is found that a local minimum of static stability in the upper troposphere and on the tropopause is achieved over the block-onset region when blocking onset takes place. From the perspective of isentropic potential vorticity, blocking onset is accompanied by extratropical tropopause elevation and a local low isentropic potential vorticity anomaly that is formed right under the elevated tropopause. This low isentropic potential vorticity anomaly is coincident with a local minimum of static stability over the block-onset region. In addition, based on static stability budget analysis, it revealed that the decrease of static stability in the upper troposphere and on the tropopause prior to blocking onset is attributable to horizontal advection of low static stability from subtropics to midlatitude as well as the stretching effect associated with upper-level convergence, with the horizontal advection forcing being the primary contributor. On the other hand, the vertical advection of static stability tends to oppose the decreasing static stability through advecting more stable air downward such that it stabilizes the local air over the block-onset region. Furthermore, the indirect and direct effect of latent heat to the local change of static stability over the block-onset region are also discussed, respectively.