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Westward rotation of the atmospheric angular momentum vector of Titan by thermal tides

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The orientation of the atmospheric angular momentum vector of Titan and its temporal variation predicted by a general circulation model are analysed and interpreted. The atmospheric angular momentum vector is tilted by a few degrees from the polar axis and the vector rotates (precesses) westward with a constant period of 1 Titan day. The fast westward rotation is likely to be caused by migrating diurnal thermal tides. The tilt is almost cancelled out in the troposphere by the wavenumber 2 pattern of Saturn's gravitational tide, but is more pronounced in the stratosphere, where thermal tides are significant. The predicted tilt angle and the equatorial angular momentum vary with season and maximize when the hemispheric asymmetry of the axial angular momentum or superrotation attains its peak.