



Wind-driven circulation in Titan's seas

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Circulation in Titan's seas forced by wind is simulated by an ocean circulation model using surface wind data predicted by a global circulation model. Wind-driven circulation is insignificant throughout much of the annual cycle, but becomes significant from late spring to late summer, when the wind stress becomes strong. The large-scale circulation in summer is predominantly southward near the sea surface and northward near the sea bottom. The sea surface current can get as fast as 5 cm s^{-1} in some areas. Titan's rotation affects the vertical structure of sea currents in the form of an Ekman spiral if the wind is strong. The maximum wind set-up at the shores is of the same order of magnitude as the tidal range. Wind stirring may reduce thermal stratification in summer, but may be unable to destroy stratification of methane-rich liquids on top of ethane-rich liquids that can result from imbalances between evaporation and precipitation.