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Global teleconnections between ocean basins

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The exchange of mass between ocean basins is investigated using a global barotropic ocean model. There are two particular cases of exchange between two basins. At periods of 4-6 days, the exchange is between the Atlantic and Pacific basins, and represents a known oscillation forced by atmospheric pressure. This mode represents a failure of the inverse-barometer relationship due to the large scale and high frequency of atmospheric forcing, and the presence of continents. Significant exchange between Atlantic and Pacific also occurs at longer periods. The second case is most prominent at longer periods (longer than 30 days, becoming strongest at periods longer than 100 days), and represents a mass exchange between the Southern Ocean and the Pacific. The reason for the exchange being with the Pacific rather than other basins is due to the balance of wind stress by form stress in Drake Passage: exchange with the Atlantic and Indian sectors becomes dominant if Drake Passage topography is removed. The barotropic adjustment processes are rapid that leads to the possibility of rapid teleconnections between ocean basins, so the possible importance of obtained results for global sea level and tropical dynamics are discussed.