



Oceanic influence on Brazilian river outflow

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Sea surface temperature has been commonly used to comprehension of climatic variability over land. Ropelewski and Halpert (1987) showed connections between annual SST and precipitation for many regions around the globe (Australia, Indian, South America, Central America, North America and Africa). Amarasekera (1997) found relationships between SST and river outflow at tropical regions. In this study we try to understand and estimate linear correlation and the possibility of construction of stochastic models considering SST and river outflow observed over North (56W; 2S) and Central (56W; 16S) Brazil, stations located at Amazon and Cuiabá rivers, respectively. The data set considered in this analysis comprises the years between 1968 and 2005 and the computation considered monthly scale. Results showed that the north region of Brazil, represented by Obidos river station (near the Amazon mouth), might have similar influence from both North Atlantic and South Pacific regions, both areas being negatively correlated to the river outflow data. In this case, SST over South Tropical Pacific region (between 20S and Equator) and Amazon river data (Obidos) are strength and negatively correlated ($-0.6 < r < -0.5$). All linear correlation values cited here showed statistical significance greater than 95%. This result suggests relations between Pacific Decadal Oscillation – PDO – and river outflow data at Obidos station since linear correlations data show negative and positive values respectively over tropical and high latitude areas over both hemispheres. The spatial pattern over Pacific Ocean obtained from correlation between SST and outflow data at Obidos is quite similar to that obtained from the first EOF mode which is related to the PDO characterization. SST at North Atlantic region (between equator and 20N) is another area well correlated to Obidos outflow ($-0.6 < r < -0.5$). SST over South Tropical Atlantic is also well correlated to Obidos outflow, showing smaller absolute values than the SST over North Tropical Atlantic (maximum values lie between +0.4 and +0.5) yet. Beside this aspect, the area covered by intense and negative values of linear correlation is much greater over the North than over the South Tropical Atlantic. These results suggest that SST from North Tropical Atlantic can be considered as better predictor than those observed at southern areas for Obidos outflow. Physically, the Intertropical Convergence Zone, ITCZ, displacement to southern areas and the trade wind from northeast constitute important atmospheric aspects that can explain rain and outflow modulation at the north region of Brazil. The Central region of Brazil, here represented by the Cuiaba riverflow, seems to be much more influenced by Pacific SST patterns than to those observed at Atlantic Ocean. Contrarily to the ocean correlation pattern discussed in the case of the riverflow for Obidos station (at the north area of Brazil) Cuiaba riverflow data are positively correlated to SST at Equatorial Central-East Pacific and negatively correlated to SST over higher latitudes for both hemisphere. This oceanic pattern is just the opposite observed for Obidos riverflow. In this case, SST positive (negative) anomalies over Equatorial Central-East Pacific are related to riverflow positive (negative) anomalies over the central area of Brazil. All oceanic regions depicted here are potential areas to be considered as predictors in stochastic models for river outflow at the north and central regions of Brazil.

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