

Development of relationship between rainfall variability in the Limpopo basin and sea surface temperature anomalies

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Master in Integrate Water Resources Management (IWRM)

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One of the most crucial issues of global climatic variability is its effect on water resources. The Mozambique part of Limpopo Basin is vulnerable to drought having been affected by devastating droughts which seem to occur every seven to eleven years. A better local rainfall prediction model would be beneficial for the sub-regions. A statistical relationship analysis of inter-annual variability (1960-2002) for the wettest months (December to February) of the main summer rainfall over the Xai-Xai, Maniquenique and Chokwe regions in the basin, with global ocean basins sea surface temperature (SST) anomalies, is thus presented. The results show that weak positive "Pearson" correlations in some areas of North Atlantic Ocean have significant effect on the rainfall variability over the regions cited above as whole. Significantly moderately negative correlations are found at some boxes of Pacific Ocean for Xai-Xai and Maniquenique regions and at central south Indian Ocean for Chokwe. An attempt to run the multiple linear regressions models (significant at 95% level of confidence) using averages SST anomalies as predictors were done. The results show a high correlation for the Chokwe (0.69) lagged by September-November SST, Maniquenique (0.69) lagged by June-August and Xai-Xai (0.66) lagged by May-July. Validation was carried out from 1991 to 2002 and gave satisfactory and reasonable results for Chokwe and Xai-Xai regions with ($r=0.7$; $R^2=0.62$) and ($r=0.63$; $R^2=0.4$) respectively and poor results for Maniquenique ($r=0.3$; $R^2=0.1$). Apart from the Maniquenique it can be concluded that forecasting based on SST can provide in advance useful indication of the highest rainfall for DJF season for Xai-Xai and Chokwe lagged by MJJ and SON respectively.