

**ABSTRACT**  
**ASSESSING THE APPLICABILITY OF SOUTHERN OSCILLATION INDEX (SOI)**  
**AND SPCZ POSITION INDEX (SPI) IN PREDICTING WATER AVAILABILITY IN VANUATU**

Kaniaha Salesa Nihmei  
University of the Philippines, 2007

Adviser: Dr. Amador Argete  
Reader: Dr. Josefina Argete

Rainfall data from the 4 stations of Sola, Lamap, Port Vila and Anelgauhat were utilized in this study. Sola and Lamap in the northern region were combined to represent the north and Port Vila and Anelgauhat represent the south of Vanuatu. The annual rainfall anomalies of the two regions have a 70% compound correlation coefficient with SOI and SPI. The SOI have a positive trend while SPI is the inverse with either rainfall or evaporation in Vanuatu. During a warm episode, the SOI goes through a negative phase and so do the rainfall anomalies. The shift of the warm pool from the western to the eastern Pacific disturbs the global atmospheric circulation particularly the Walker circulation. The shift of the circulation to the east not only moves away the rain producing mechanisms of the western Pacific, but also shifts the SPCZ further north from its usual location. The low pressure systems move towards the east and hence lowering the pressure values in Samoa resulting in a positive SPI. There is a deficit in water availability for the northern Vanuatu during June, July and August, of no more than 100mm. In the southern Vanuatu the deficit is recorded from April to December. This is due to the higher evaporation which exceeds the rainfall from July to October in the southern Vanuatu than the north. The mean dekad relationship for water availability has a higher correlation with SPI for north (-17%) and southern (-19%) Vanuatu than the SOI which has a correlation of 7% both in the north and south of Vanuatu. The same relationship is not duplicated when SOI and SPI of the first dekad of any month is made to predict the rainfall anomalies and soil water storage of the second dekad of the month and so forth. The inability of the model to capture the relationship for forecasting may be due to the very high noise that cannot be smoothed out during the 10-days averaging of the pressure, as well as the smallness and the high mobility of the SPCZ.