

The Comparison of the Reanalysis 1 Data with the *In-Situ* observations: Case Study 2016 Data Sets for Zanzibar.

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Abstract

The study analyzed the performance of the Reanalysis 1 data to the *in situ* (observation) data from Zanzibar Meteorological Office defined by 6.22°S and 39.22°E for the 2016. The *in situ* data were daily mean dry bulb, maximum and minimum temperatures and the daily mean sea level pressure. Similar parameters were used for re-analysis 1 data at 2m and at 995 sigma levels, respectively. The statistical measures of central tendency including the mean, variance, percentage relative and root mean square errors (RMSE) were analyzed, and the daily variability of these parameters for the 2016 was plotted and analyzed. Moreover, correlation coefficients, analysis of variance (ANOVA) and the T – tests were performed. The results revealed that, the dry bulb temperatures the difference in the annual mean between the three data sets ranged from 1.05 to 1.2⁰C, and their difference in variance ranged from -0.19 to 0.15⁰C, respectively. The correlation between observed and the re analyzed daily mean temperatures at $p < 0.05$ ranged from 0.8 to 0.85, with the relative percentage error ranged from -2 to 10%, and a root mean square error of 0.04 and 0.08 respectively. Moreover, the difference in mean and variance between the observed slp to the reanalysis data was 3.23 hPa and 7.78hPa indicating that, the variability in observed data was higher compared to gridded data. Besides, the two pressure data sets were poorly correlated with a correlation factor (r) of 0.04 and the parentage relative error of -0.2 to 0.8% and RMSE value of 0.25. As for the, T tests the results showed that, the daily mean differences from these three data sets were not significant indicating that, the reanalysis data were mimicking the daily observed records. Conclusively, the results indicate that the gridded reanalysis 1 data can be used as a substitute of the observation data for remote areas, though long time data records are required to validate the findings.