Bovolo C. I.[1], Pereira R.[2], Parkin G.[3], Wagner T[4]., Investigating the climate transition zone in Guyana, South America *Abstract H51A-0864* presented at 2010 Fall Meeting, AGU, San Francisco, Calif. 13-17 Dec. 2010

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Abstract: The climate of Guyana is influenced by the seasonal oscillation of the rain-bearing Inter-Tropical-Convergence Zone over the northern part of South America, producing two wet seasons on the coast and one wet season inland. The transition zone between the two climate regimes also corresponds to a distinct vegetation transition between intact and highly biodiverse rainforests in northern and central Guyana, and open, savannah type vegetation in the southwest. Coastal Guyana has been shown to be highly susceptible to El Niño Southern Oscillation (ENSO) events, with El-Niño conditions most likely to result in drought; however a brief analysis of available observations suggests that an opposite effect may exist inland. Geographically sparse meteorological records of variable quality (especially inland) have so far precluded detailed climatic studies of the Guianas. It is important therefore, to establish the climate regime of the area and to analyse the influence of ENSO on the region in order to derive baselines against which the impacts of any future landuse change or climate change can be measured. The impacts of climatic variations on the ecosystem services of the area can then also begin to be determined. This study compares the ECMWF ERA40 reanalysis dataset for the period 1957-2002 at a ~125 km2 (1.125 degree) resolution against available areally averaged meteorological observations in the Guyanas to determine if reanalysis data can be used to supplement observations in data-poor areas. Mean differences (biases) and correlations are examined comparing the seasonal cycles and the yearly, monthly and monthly anomaly time series. Results show that maps of average annual reanalysis precipitation for the region compare favourably against observations, although the model underestimates precipitation in some zones of higher elevation. ERA40 also appears slightly positively biased on the coast and negatively biased inland. Correlations between observed and modelled timeseries show that the model has limited skill at the monthly and annual level, but that ERA40 captures the seasonal variations in precipitation and temperature relatively well. A grid-cell by grid-cell analysis gives a complete picture of the spatial variation of precipitation and temperature over the region. Recent data from the new Iwokrama International Centre hydro-climate monitoring program are also compared against ERA40 average monthly precipitation and temperature to give new insights into the climate transition zone and the local influences of ENSO. This data is important for aiding our understanding of the complex relationships that exist between climate, forests and water cycling in this area.