Tolulope M. DARAMOLA **t.daramola@yahoo.com**

Impacts of Forest Degradation on Land Precipitation in the Sub-Saharan Africa.

Course: Global Warming: The Science of Climate Change

Continuous expansions of degraded lands have been a major concern in the global discussions. Land degradation is caused by various factors, including climatic variations and human activities (UNCCD, 2012). Land is central to development in sub-Saharan Africa, as the livelihoods of about 60% of the population are dependent on agriculture (Vlek and Tamene, 2003). Removal of vegetation that protects the soil is a major factor of degradation in the sub-Saharan Africa. After vegetation removal, water evaporates quickly, leaving behind dissolved salts in the soil.

In this study, I focused on the precipitation retention in soil, aftermath of vegetation removal, in sub-Saharan Africa as recorded by history. I used the AR5 Mapper (http://climatemodels.uchicago.edu/maps/) for my model, and selected precipitation variables using bcc-csm1-1 GCM Models. I compared the annual mean precipitation since 1973 to 2013 at 10 years interval. To generate precise scenarios, I chose the same location at the Coordinate of 2.79, 15.46 throughout the model. The location was positioned in Nigeria, West Africa, which is situated in the sub-Saharan Africa. The result of the scenarios is given below in Fig 1 to 5.

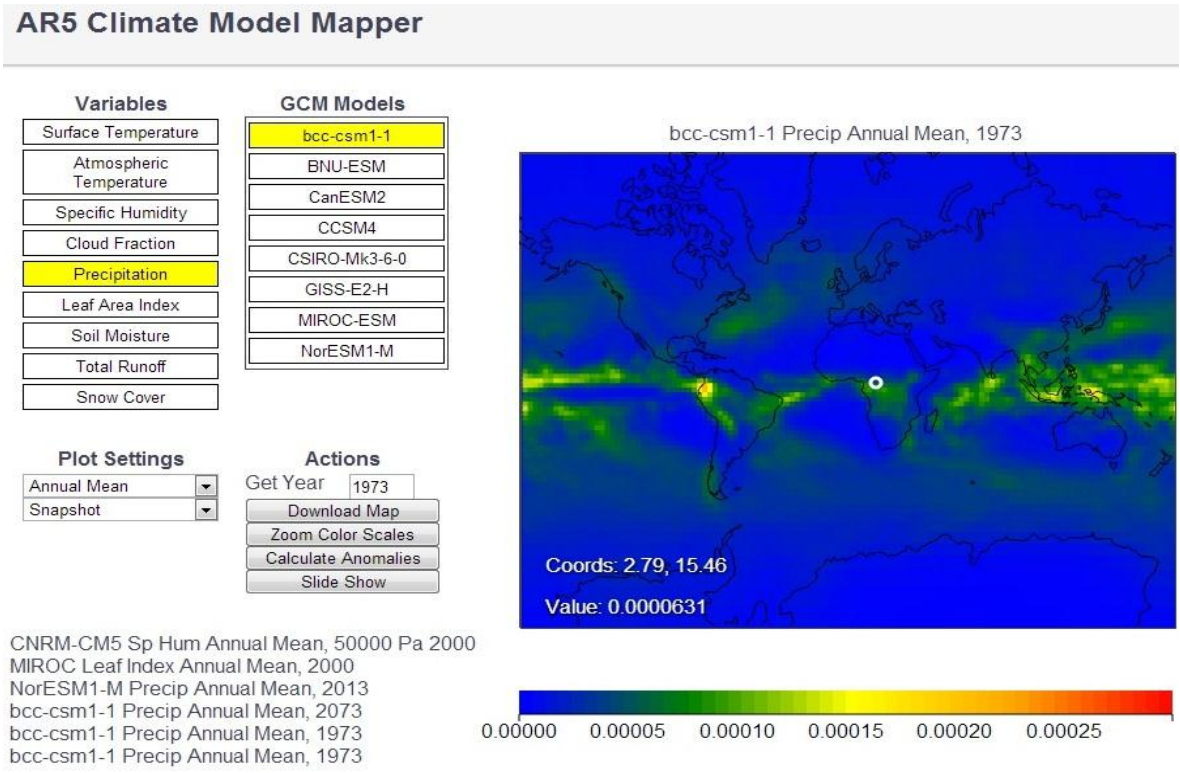

Fig 1 - Year 1973, shows a precipitation value at 0.0000631

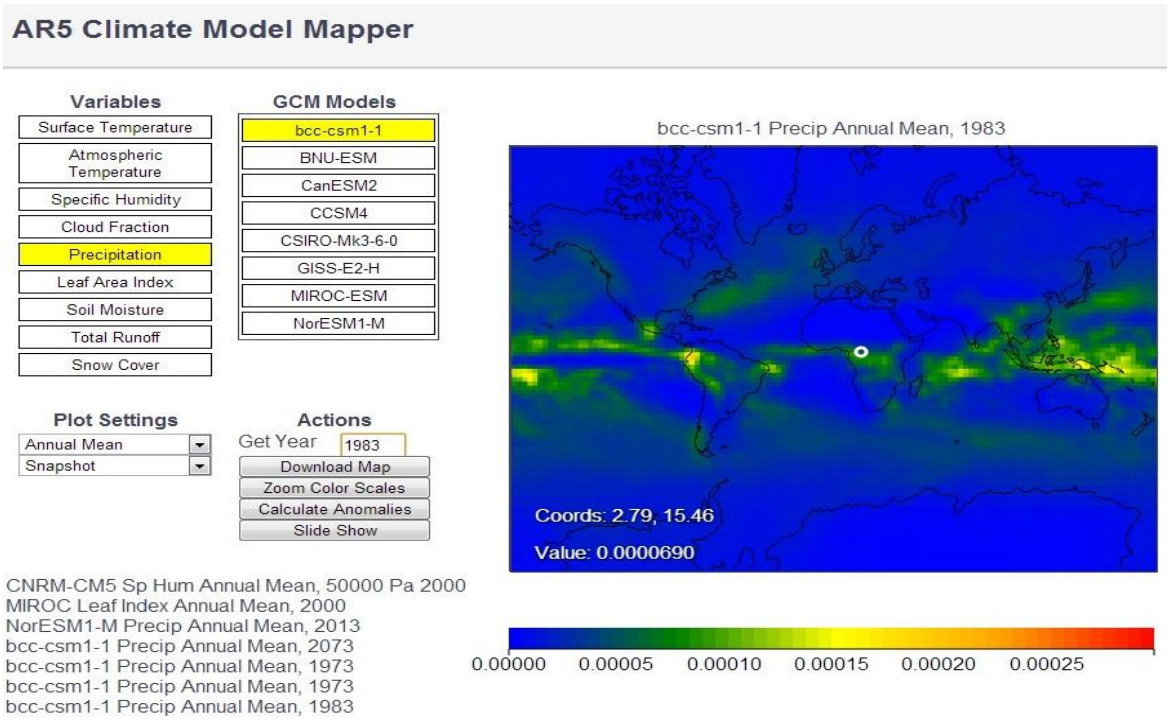

Fig 2 - Year 1983, shows a precipitation value at 0.0000690

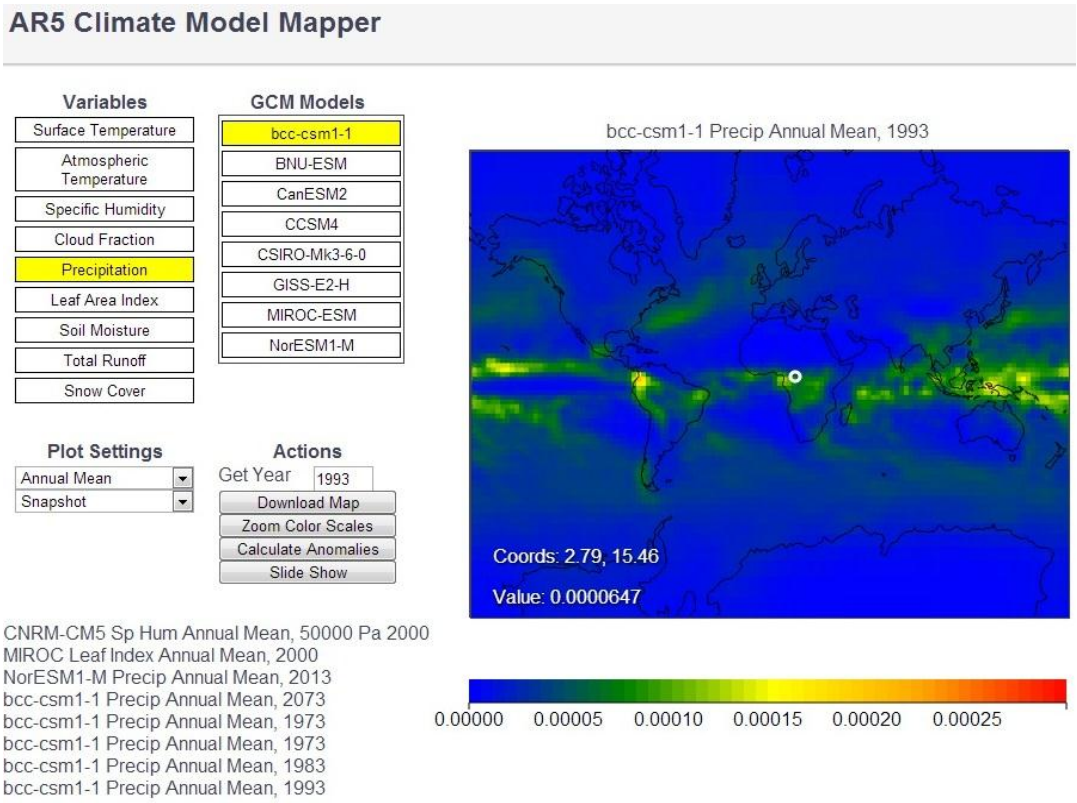

Fig 3 – Year 1993, shows a precipitation value at 0.0000647

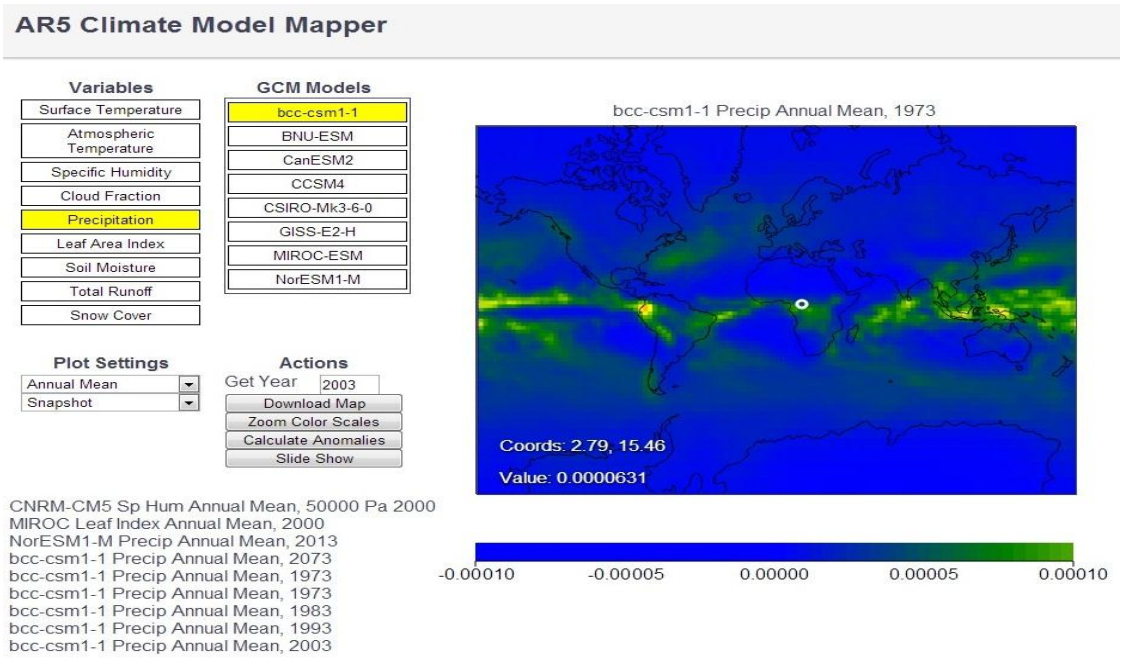

Fig 4 – Year 2003, shows a precipitation value at 0.0000631

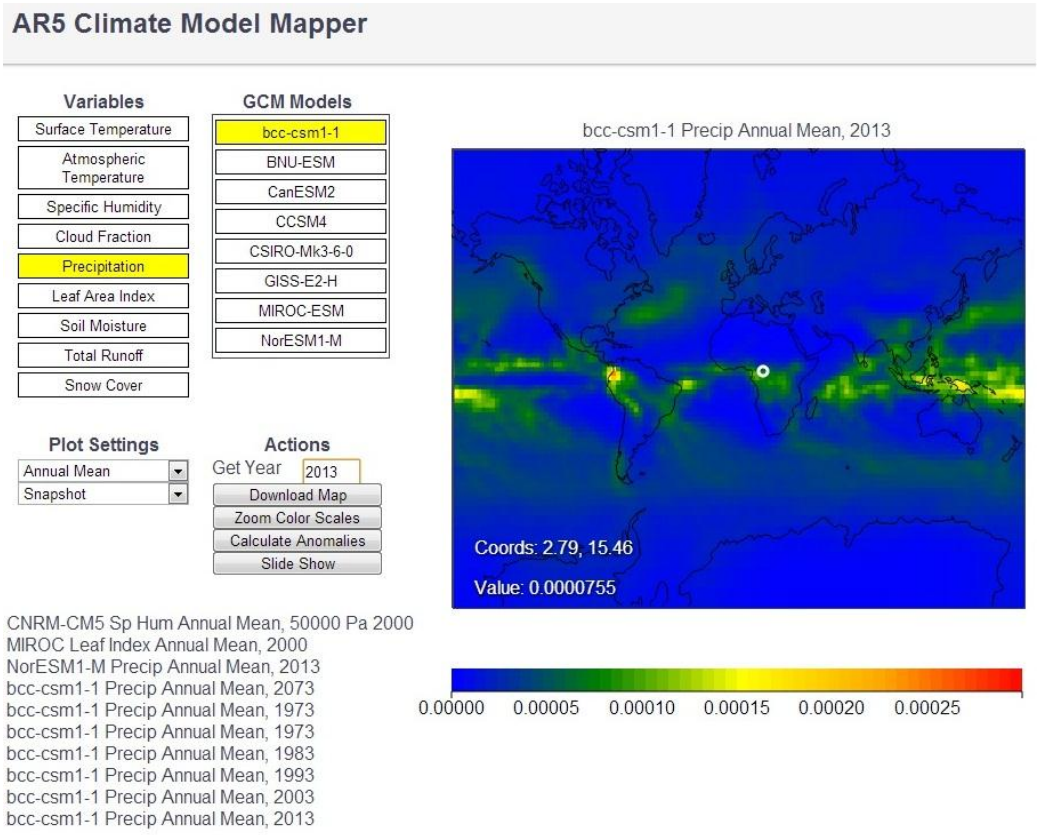

Fig 5 – Year 2013, shows a precipitation value at 0.0000755

According to the value provided between 1973 to 1983, there is a clear indication that the region is protected with substantial amount of vegetation cover, and we can see this reflected from the growing precipitation value from 0.0000631 in 1973 to 0.0000690 in 1983. However, there was a drastic decline to the precipitation level in 1993 to 0.0000647and the decline trend continues in 2003 back to 0.0000631. This result could be attributed to the growing population in the 90s that led to high deforestation rates in the region (FAO, 2011). However, FAO (2011) reported the net change in forest areas in the period 2000-2010 is estimated at -5.2 million hectares per year at the global level. This is down from -8.3 million hectares per year in the period 1990–2000. The FAO report is tantamount to the result as provided in the model on Fig 5, which shows that in the year 2013 the precipitation value rose to 0.0000755.

Land degradation in the sub-Saharan Africa is a major challenge, which has undermined the capacities of the region to cope with the disasters, adapt to climate variability, and change in the long-term. However, the study also reveals the benefits in restoration of the degraded lands, which could serve as catalyst to food security, soil nutrition, fertilization for farmlands and prevention against environmental disasters. To this end, acting now and acting fast to rehabilitate degraded lands will serve enormous purposes that would alleviate the vulnerable in the sub-Saharan Africa and avert the more expensive delayed action towards adaptation.

Reference

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