Statistical downscaling global climate models to fine-scales over Sri Lanka for applications in the fisheries sector

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The climate directly impacts economic activity of multiple sectors in Sri Lanka. In the fisheries sector, the climate impacts on fisheries habitats, and stream flow into and evaporation from reservoirs, estuaries and lagoons. Thus, adequately precise climate forecasts pave the way for its integration into predictions of variables such as rainfall evaporation fluxes and temperature that can be used to predict drought, soil moisture, evaporation, stream flow, reservoir levels and properties of inland and coastal water bodies. Seasonal and long-term climate predictions are available presently based on Global Climate Models that are at large scale – typically 250 km grid. In Sri Lanka, however, much finer scale predictions (less than 20 km) are needed as there is significant spatial variability in climate. This study uses Linear Regression based statistical downscaling methodologies over Sri Lanka. APCC climate information tool kit 2.0 (CLIK) is used for statistical down scaling. The dynamical downscaling uses previously generated RegCM4 simulation archives developed by International Center for Theoretical Physics (ICTP), IRI archives for 30 years and Global Climate Model (GCM) outputs from the APEC Climate Center (APCC) in South Korea. The downscaling skill is assessed using Heidke Skill Score (HSS). Results showed that dynamical downscaling has higher HSS of 0.142 compared to statistical downscaling method used in the study which is 0.083. However, due to computational limitations priority was given to statistical downscaling. Using CLIK hind cast skill score, northern part of Sri Lanka obtained reasonable skill (0.34 – 0.66) for JFM and JAS seasons. Poor skill (0.33) is obtained for the Southern part of the island for JFM and JAS seasons. For the season of OND and AMJ, the entire island obtained reasonable skill and poor skill, respectively. CLIK picked SCM method and IRIF, POAMA, MGO and NIMR models from trial and error method.

Keywords: statistical downscaling, fisheries, CLIK, Sri Lanka

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