

Impact of Cyclone Kyarr on the chemical weathering and carbon-dioxide consumption rate in a tropical shield catchment in Southwestern India

ARUN KUMAR¹, BALAKRISHNA KESHA², AMRISH VADAKKEVEEDU NARAYAN², NISHITHA D'SOUZA¹ AND UDAYASHANKARA HARIKRIPA NARAYANA²

¹Manipal Institute of Technology, Manipal Academy of Higher Education

²Manipal Institute of Technology, Manipal Academy of Higher Education, India

Presenting Author: arubelli93@gmail.com

The recent increase in the frequency of tropical cyclones has resulted in the coupling of chemical weathering and physical erosion in tropical shield catchments; however, there is paucity of data from these catchments. We estimated chemical weathering in a Precambrian Shield catchment through the major ion fluxes in River Kali, Southwestern India, pre and post-cyclonic storm *Kyarr*, in October 2019. Data revealed that the cyclone has enhanced the leaching of catchment topsoil and exposed fresh silicate rock surfaces. This in turn, was subjected to physical erosion through intense rainfall and runoff. As a result, elevated levels of silica was released both from the rock surfaces and soil porewater. These processes were accelerated by organic ligands produced by the abundant vegetation cover in the catchment. About 20% higher silicate weathering rate was observed during the storm event. Storm-derived CO₂ consumption rates for silicate weathering increased ~2 times after the cyclone *Kyarr*. This highlights the importance of extreme climatic events on small mountainous rivers as a global CO₂ sink.