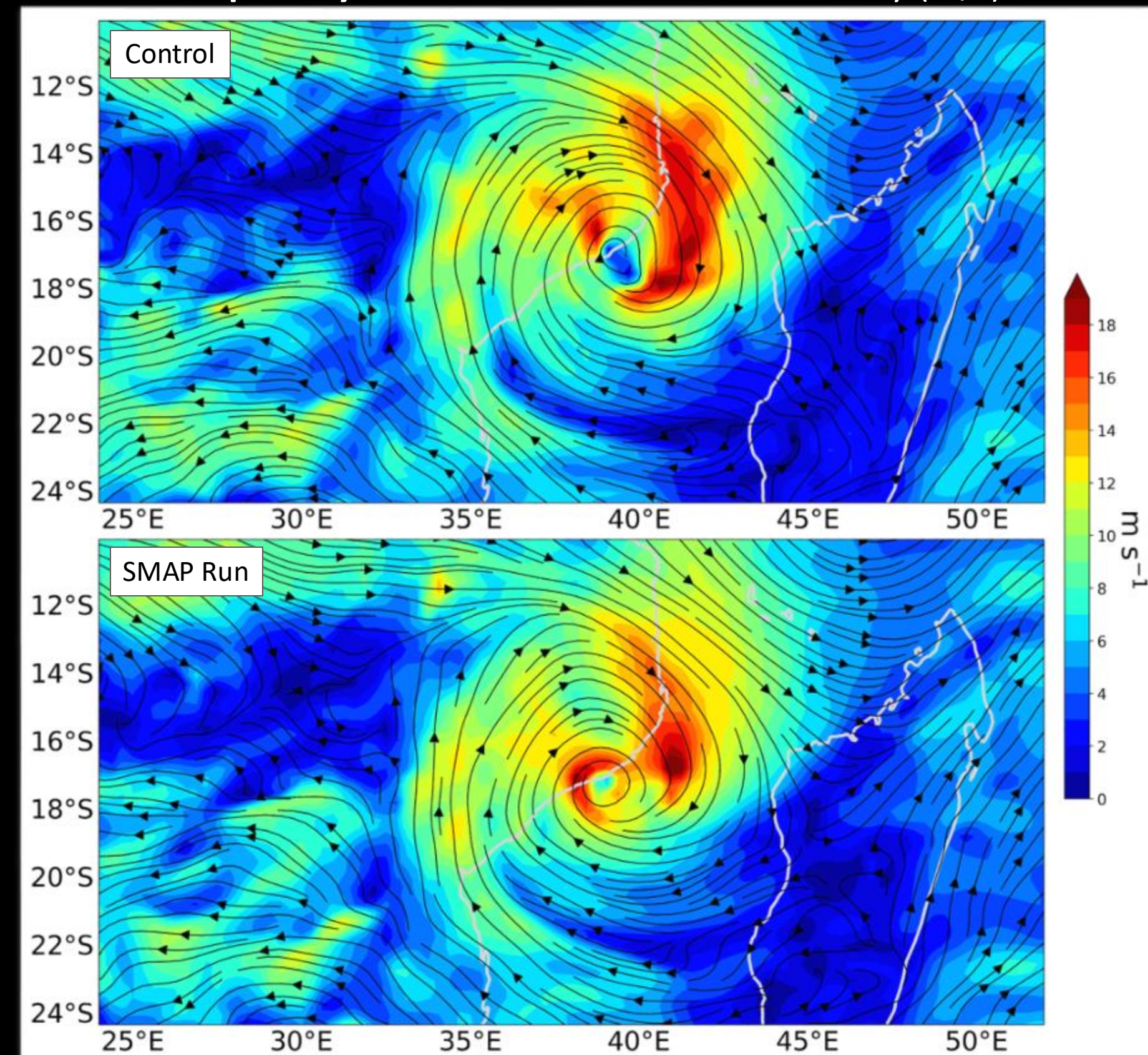


Tropical Cyclone Idai – 800 mb Wind Velocity (m/s)



Soil moisture conditions can influence tropical cyclones (TCs) over land, with dry soil causing faster TC dissipation and wetter soil allowing TC persistence. An analysis done for TC Idai in 2019 shows that by assimilating observations from the Soil Moisture Active Passive (SMAP) mission over land into the Goddard Earth Observing System (GEOS), the reconstruction and prediction of TCs in GEOS can be improved. Specifically, the data assimilation (DA) of SMAP observations leads to a more realistic vertical structure and size of the analyzed TC compared to a control simulation without SMAP DA. Additionally, SMAP assimilation into GEOS leads to reduction of forecast errors in intensity and track of TCs against independent observations. This proof-of-concept case study demonstrates a step towards improved TC prediction in GEOS.

Figure: 800-hPa wind velocity [m/s] at 00z on Mar 9, 2019, in the control experiment (top) and the experiment with SMAP DA (bottom). After an extended 5-day loop over land, the SMAP DA experiment exhibits higher wind speeds, increased vorticity, and a tighter, better-defined eye.