EGU22-4948
https://doi.org/10.5194/egusphere-egu22-4948
EGU General Assembly 2022

Teleconnection-driven sub-seasonal predictability of extreme events: Relevant case studies

Daniela I.V. Domeisen[1,2], Christopher J. White[3], Hilla Afargan-Gerstman[2], Salomé Antoine[4], Constantin Ardilouze[4], Lauriane Batté[4], Suzana J. Camargo[5], Dan Collins[6], Laura Ferranti[7], Johnna M. Infanti[8,9], Matthew A. Janiga[10], Erik W. Kolstad[11], Emerson LaJoie[6], Linus Magnusson[7], Sarah Strazzo[12], Frédéric Vitart[7], and C. Ole Wulff[11]

[1]University of Lausanne, Switzerland (daniela.domeisen@unil.ch)
[2]ETH Zürich, Zürich, Switzerland
[3]Department of Civil and Environmental Engineering, University of Strathclyde, Glasgow, UK
[4]CNRM, Université de Toulouse, Météo-France, CNRS, Toulouse, France
[5]Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, USA
[6]Climate Prediction Center, NOAA/NWS/NCEP, College Park, MD, USA
[7]European Centre for Medium-Range Weather Forecasts, Reading, UK
[8]NOAA/NWS/NCEP/Climate Prediction Center, College Park, USA
[9]Innovim, LLC, Greenbelt, Maryland, USA
[10]Naval Research Laboratory, Monterey CA, USA
[11]NORCE Norwegian Research Center, Bjerknes Center for Climate Research, Bergen, Norway
[12]Embry Riddle Aeronautical University, Daytona Beach, FL, USA

Extreme weather events have devastating impacts on human health, economic activities, ecosystems, and infrastructure. It is therefore crucial to anticipate extremes and their impacts to allow for preparedness and emergency measures. There is indeed potential for probabilistic subseasonal prediction on timescales of several weeks for selected cases of extreme events that are linked to remote drivers and large-scale teleconnections. We here present a range of case studies, including heatwaves, cold spells, and tropical cyclones, where precursors and global linkages may have improved sub-seasonal predictability. These linkages include teleconnections from the tropics as well as the stratosphere, in addition to circumglobal teleconnections. The considered heatwaves exhibit predictability on timescales of 3-4 weeks, while this timescale is 2-3 weeks for cold spells. Precipitation extremes are the least predictable among the considered extremes. Tropical cyclones, on the other hand, can exhibit probabilistic forecast skill on timescales of up to 3 weeks, which tends to be favored by remote precursors such as the Madden-Julian Oscillation. These case studies clearly illustrate the potential for event – dependent advance warnings for a wide range of extreme events globally. The subseasonal predictability of extreme events allows for an extension of warning horizons, can provide advance information to impact modelers, and informs communities and stakeholders affected by the impacts of extreme weather events.