Title - Dynamics of extreme wave-activity events in a warming climate.

Abstract - Extreme weather in the midlatitudes, such as cold spells and heatwaves driven by persistent blocking events are closely tied to the behaviour of the jet stream. A key open question is how climate change will reshape this behaviour. Will the midlatitude jet become wavier and more prone to extremes, or more zonal and stable? In this talk, I will address this question using the Local Wave Activity (LWA) framework, which provides a clear and physically grounded way to track large-amplitude atmospheric waves. By analysing three large-ensemble climate model simulations, I show that, on average, the jet stream becomes less wavy in a warming climate. However, the story is more nuanced. The likelihood of extreme wave events changes in regionally distinct ways. These responses are dynamically consistent with theoretical expectations based on the non-acceleration relation and the recently proposed traffic-jam framework for atmospheric blocking. In the latter part of the talk, I will extend this analysis to the summer season, examining the role of wave activity in shaping heatwave dynamics and highlight key differences in the governing mechanisms over land and ocean.