

Influence of Sea Surface Temperature on Mid-Latitude Cyclones in an Idealized Framework

*Hai Hoang Bui^{1,2}, Thomas Spengler¹, Annick Terpstra¹

1. University of Bergen, 2. Hanoi University of Science

Mesoscale oceanic features, such as sea surface temperature (SST) fronts, were shown to have an influence on storm tracks and thus mid-latitude cyclones evolution and their trajectories. Hence, there is a need for a better understanding of how these mesoscale oceanic features interact with cyclones. While the essential mechanisms are sometimes difficult to isolate from observational data and complex models, an idealized framework can serve as a useful tool.

In this study, we investigate the influence of SSTs and SST fronts on mid-latitude cyclones using an idealized framework of moist baroclinic channel simulation. The initial balanced atmospheric fields are derived from an initial profile of zonal wind that resembles the jet stream. A series of experiments is designed to simulate different SSTs, including changes in the SST front location and strength. We will discuss the different mid-latitude cyclone evolutions in relation to the SST and pinpoint sensitivities with respect to the influence of basic state SST versus strength of the SST front.

Keywords: mid-latitude cyclone, sea surface temperature, idealized simulation