Supercells in the Alpine region - from observations to idealized modelling

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The Alpine region is known for its prevalence of severe convection, particularly hailstorms, which have significant societal impact. While numerous studies focus on hail, supercell thunderstorms have not been an area of active research.

To establish a first-time systematic record of supercells in Switzerland, a mesocyclone detection algorithm was developed for the Swiss operational radar network. As mesocyclone detection relies on rotation detection in Doppler velocity data, this data needs to be high-quality and with as few errors as possible. Thus, a novel dealiasing algorithm for Doppler-data processing was developed, tailored to the setup of the Swiss radar network.

Utilizing both algorithms, the Doppler data of the 6-year 5-radar archive was reprocessed and subsequently fed to the mesocyclone detection algorithm to establish a past record of supercell thunderstorms in Switzerland. This dataset allows for a characterization of the spatio-temporal occurrence of supercells in the Alpine region. To put this in context with other severe convection, such as hail or rainstorms, radar-based thresholds are used to classify these storms as well over the same 6-year period, permitting a direct comparison of the frequency and intensity distribution of these different types of thunderstorms.

This multi-year analysis helps identify orographic locations of interest to investigate in a modelling study. Replicating specific terrain features and environmental conditions in the idealized mesoscale model CM1 advances our understanding of how certain features impact a storm's lifecycle.

Thursday, 5 May 2022, 2:00pm
Refreshments 1:45pm
NCAR-Foothills Laboratory, 3450 Mitchell Lane
FL2/1022, Large Auditorium

Seminar will also be live webcast
https://operations.ucar.edu/live-mmm
Participants may ask questions during the seminar via Slido.