

Frontal Precipitation Enhancement Upstream of the Olympic Mountains During OLYMPEX IOP1

BRANDON A. GARCIA, DEANNA A. HENCE, AND ROBERT M. RAUBER

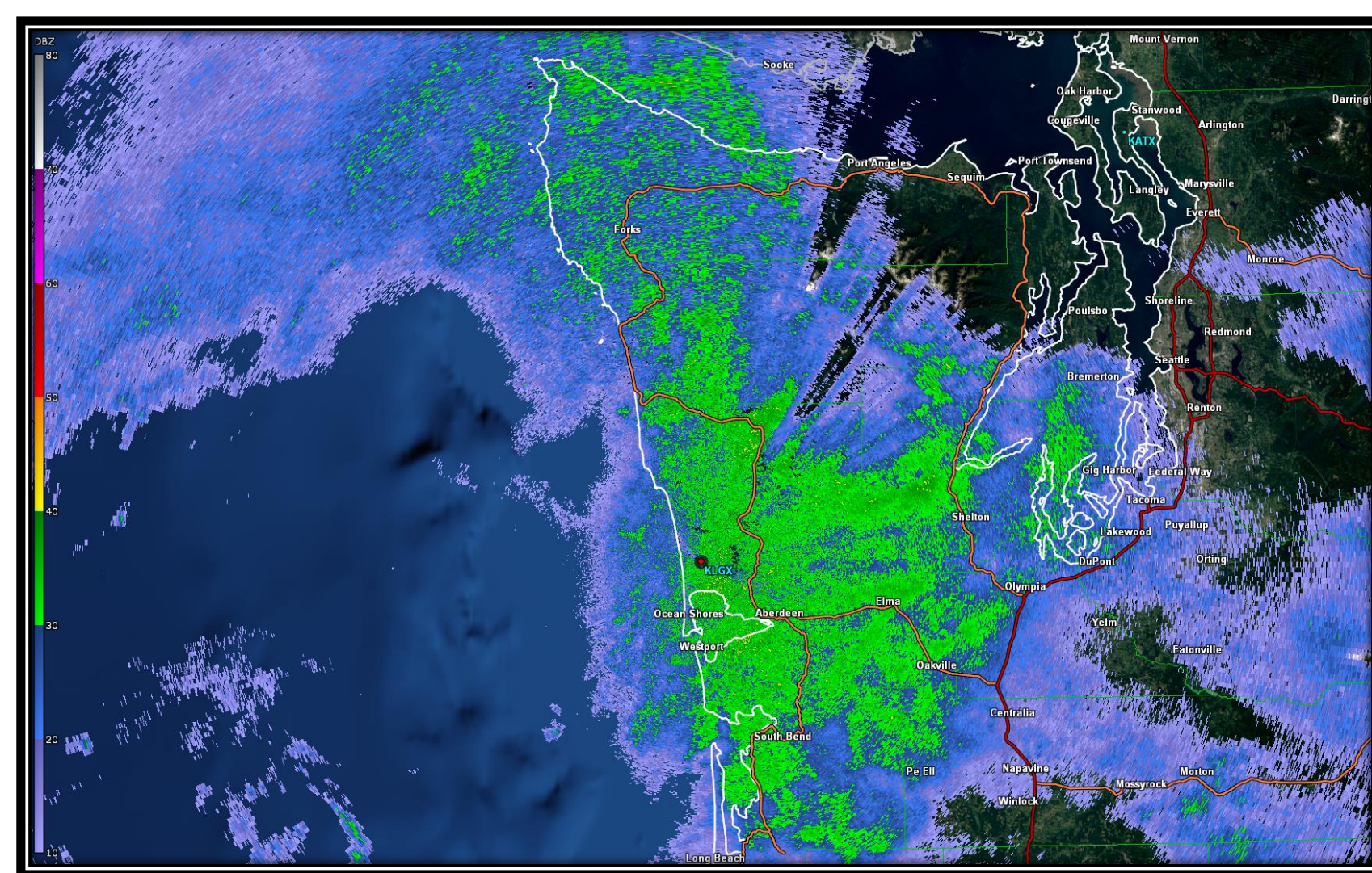
Department of Atmospheric Sciences, University of Illinois, Urbana-Champaign, Illinois

Motivation

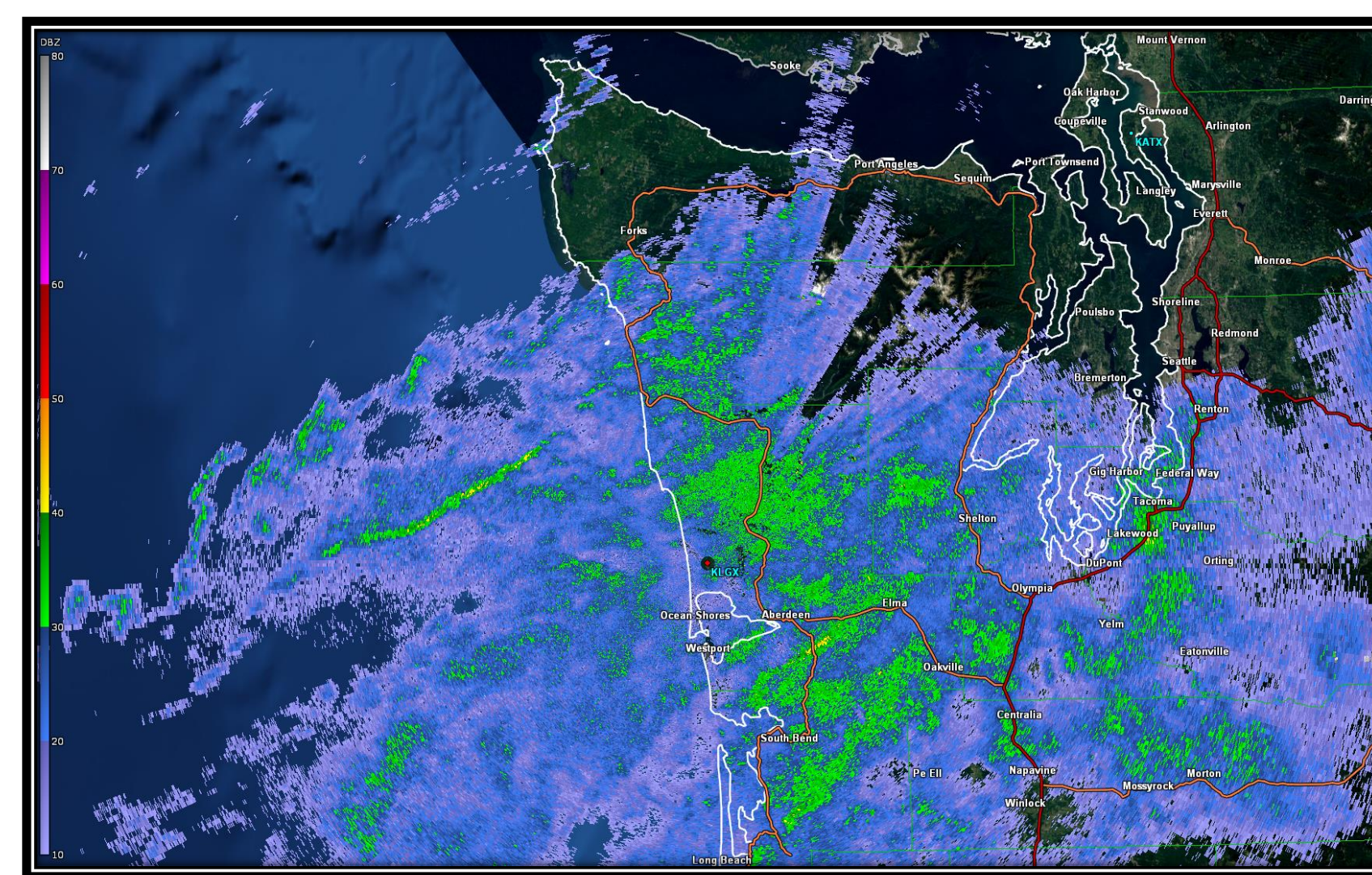
- Throughout the world's mountainous terrain, orographic precipitation enhancement greatly increases the total rainfall.
- Previous studies have found that orographic enhancement plays a significant role in flooding and mudslide events upstream of the mountains themselves.
- The processes that cause this enhancement have not largely been explored in detail.

Data and Methodology

- National Weather Service Langley Hill WSR-88D PPI scans from 29 October 2015 - 18 November 2015.
- Taken from the OLYMPEX field campaign in the Olympic Mountains of Washington state, USA which aimed to validate satellite precipitation measurements.



3z Reflectivity



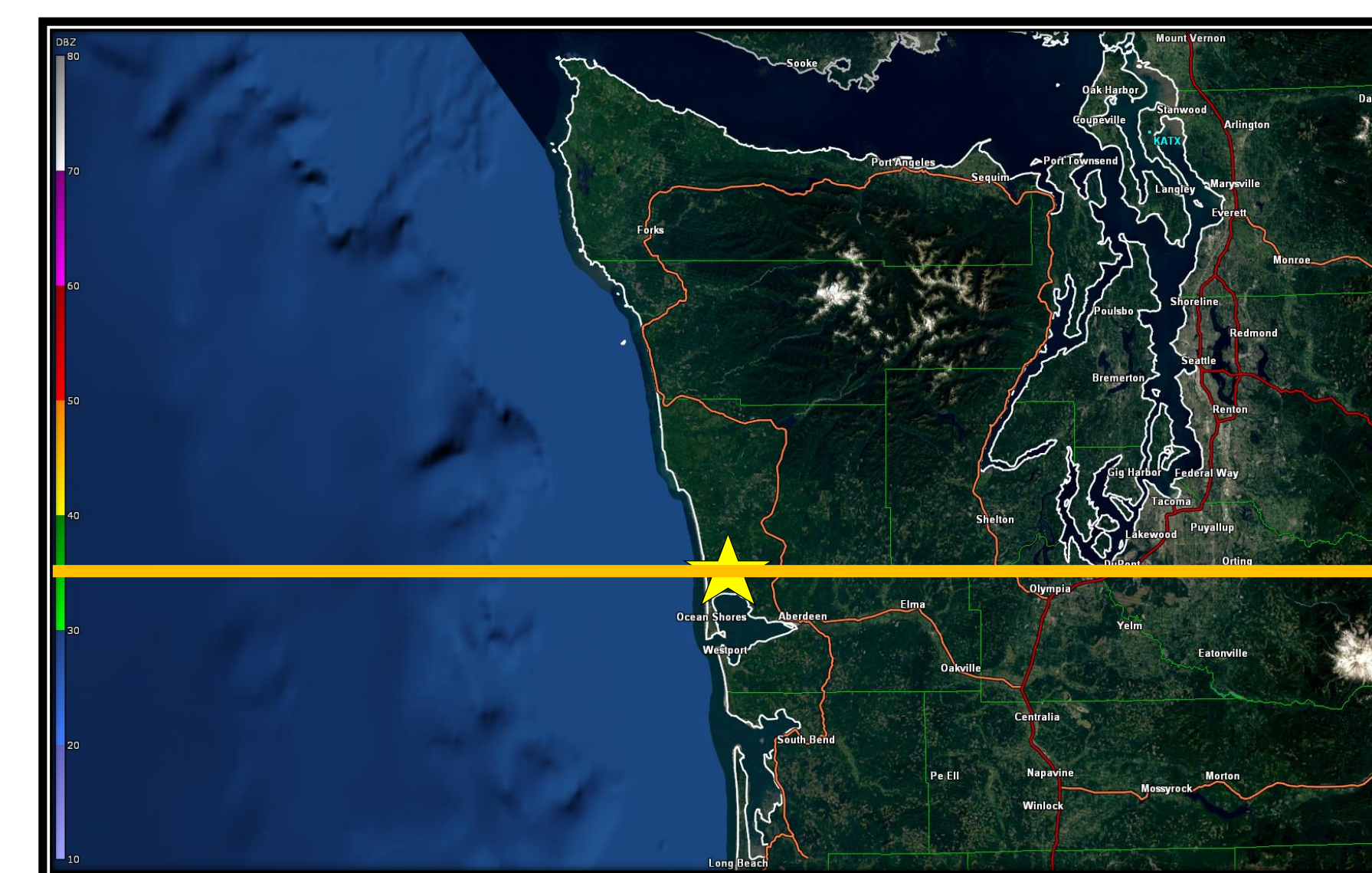
15z Reflectivity

What is the best way to identify enhancement?

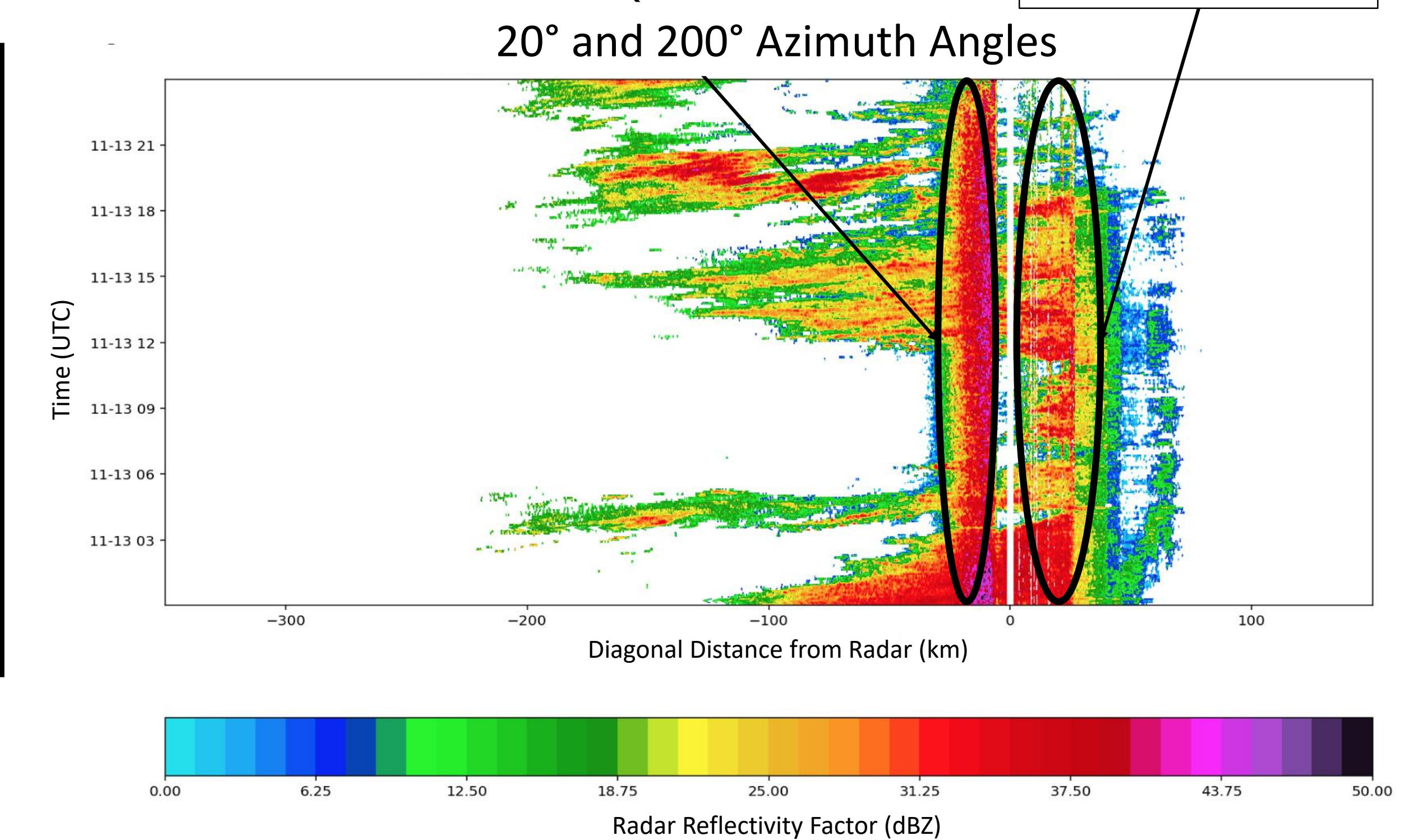
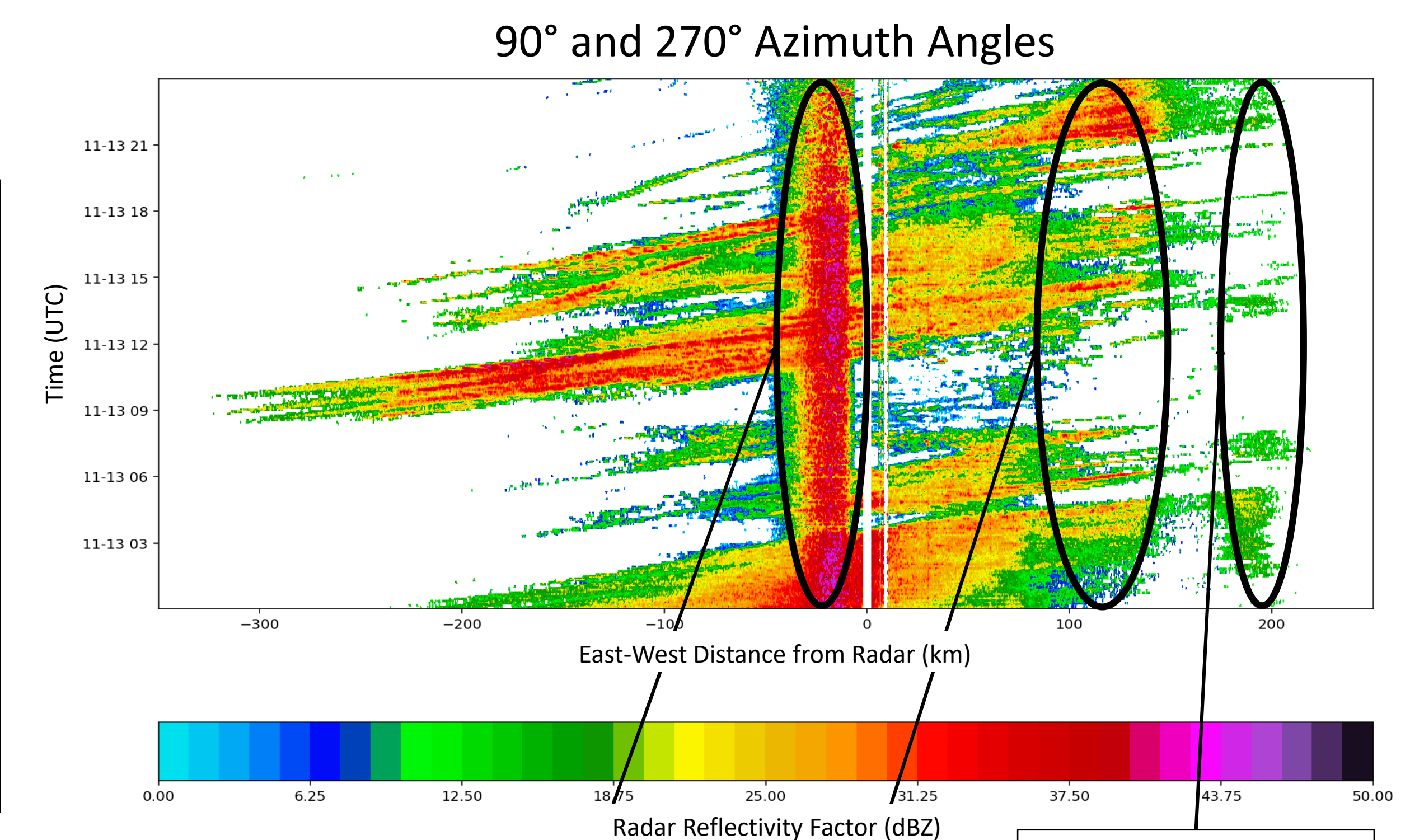
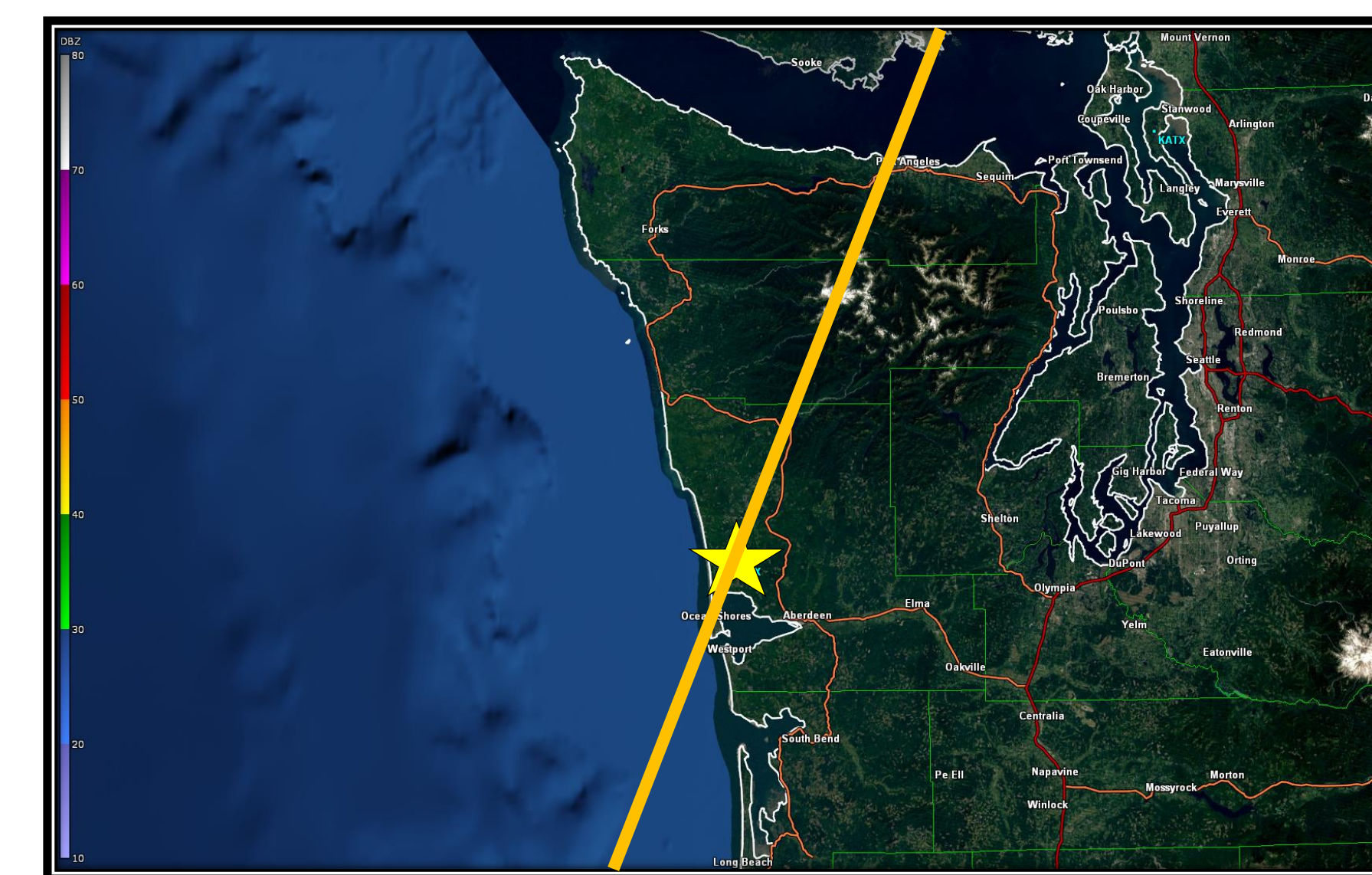
The Hovmöller Diagram

- Hovmöller diagrams provide an effective and unique view when analyzing upstream precipitation enhancement.
- Hovmöller diagrams of radar reflectivity east and west of the radar indicate differences in the east-west propagation speeds of precipitation over time.
- By analyzing the propagation speeds and reflectivity values, this visualization technique also allows for the identification of different types of precipitation features.

Examples of Hovmöller Diagrams



★ Radar Location
— Data Lines



Future Work

- Future work will consist of identifying and removing radar artifacts, analyzing other parameters (correlation coefficient, differential reflectivity, etc.), focusing on individual precipitation events, and eventual analysis of the details behind the enhancement of precipitation.
- Open to inputs or critiques.