



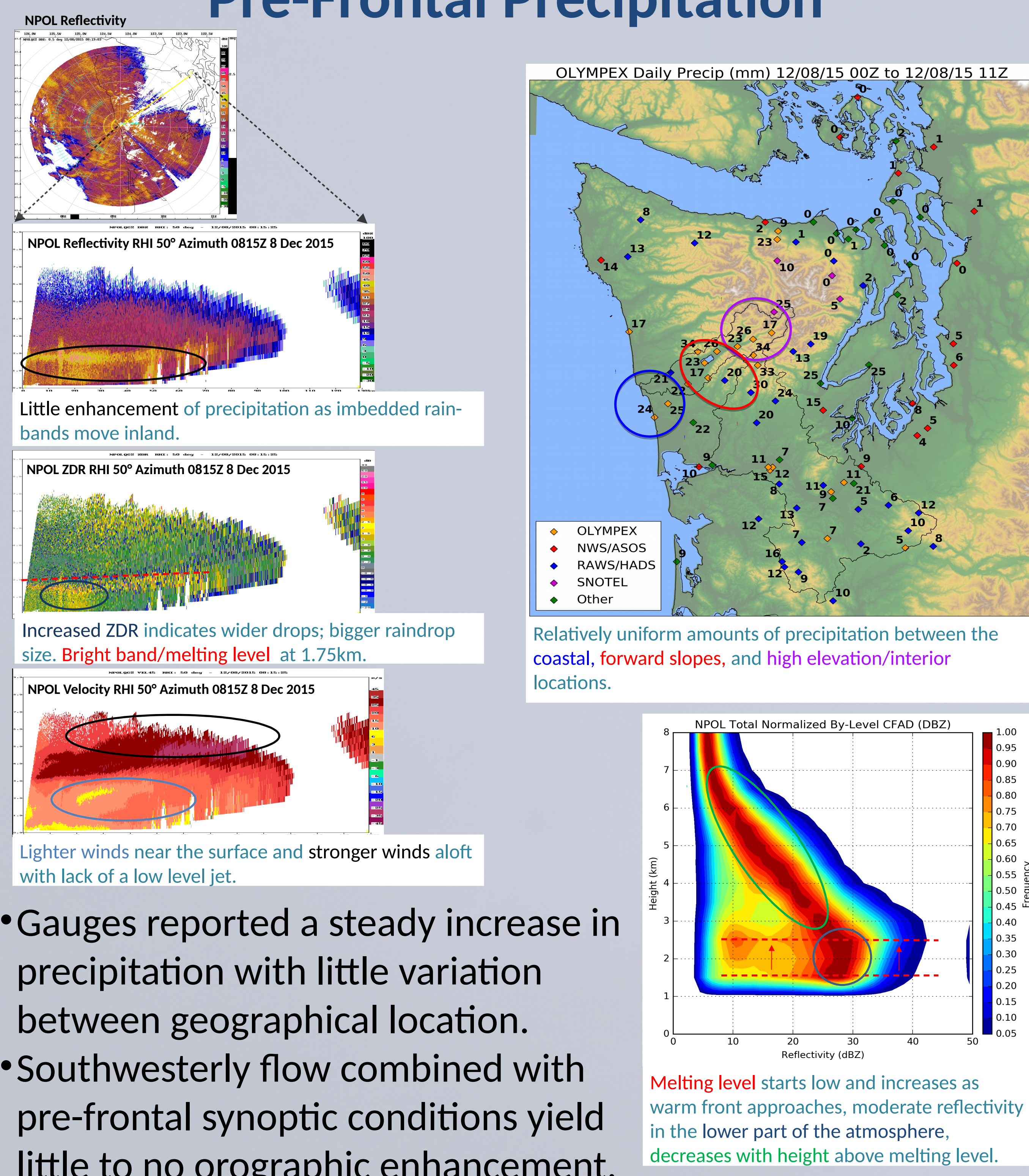
Orographic Precipitation Enhancement Over the Olympic Peninsula

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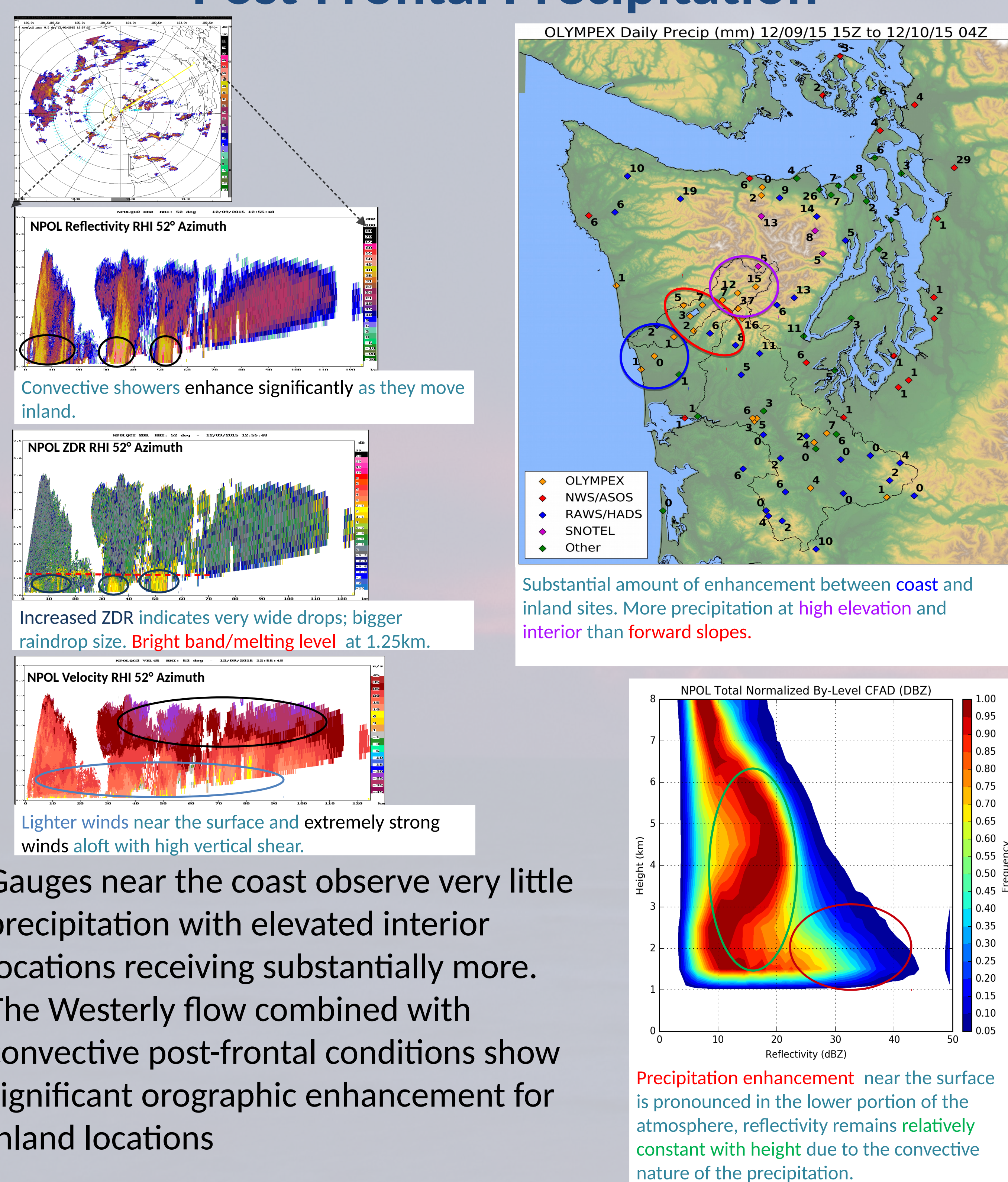
Pre-Frontal Precipitation



- Gauges reported a steady increase in precipitation with little variation between geographical location.
- Southwesterly flow combined with pre-frontal synoptic conditions yield little to no orographic enhancement.

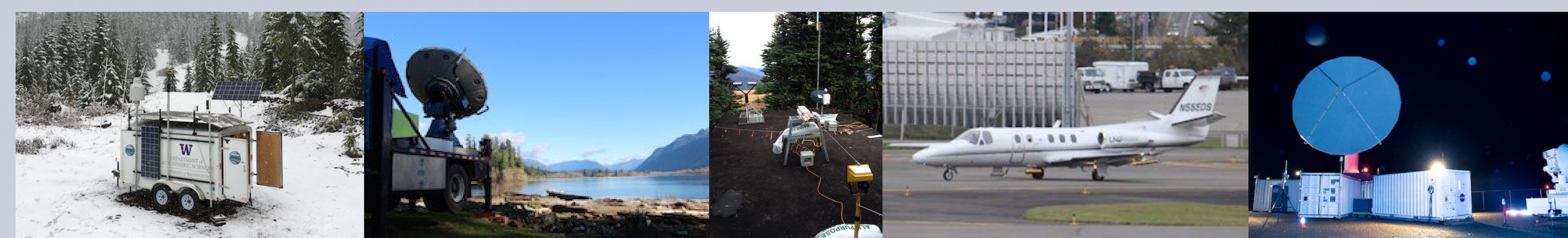
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Post-Frontal Precipitation



- Gauges near the coast observe very little precipitation with elevated interior locations receiving substantially more.
- The Westerly flow combined with convective post-frontal conditions show significant orographic enhancement for inland locations

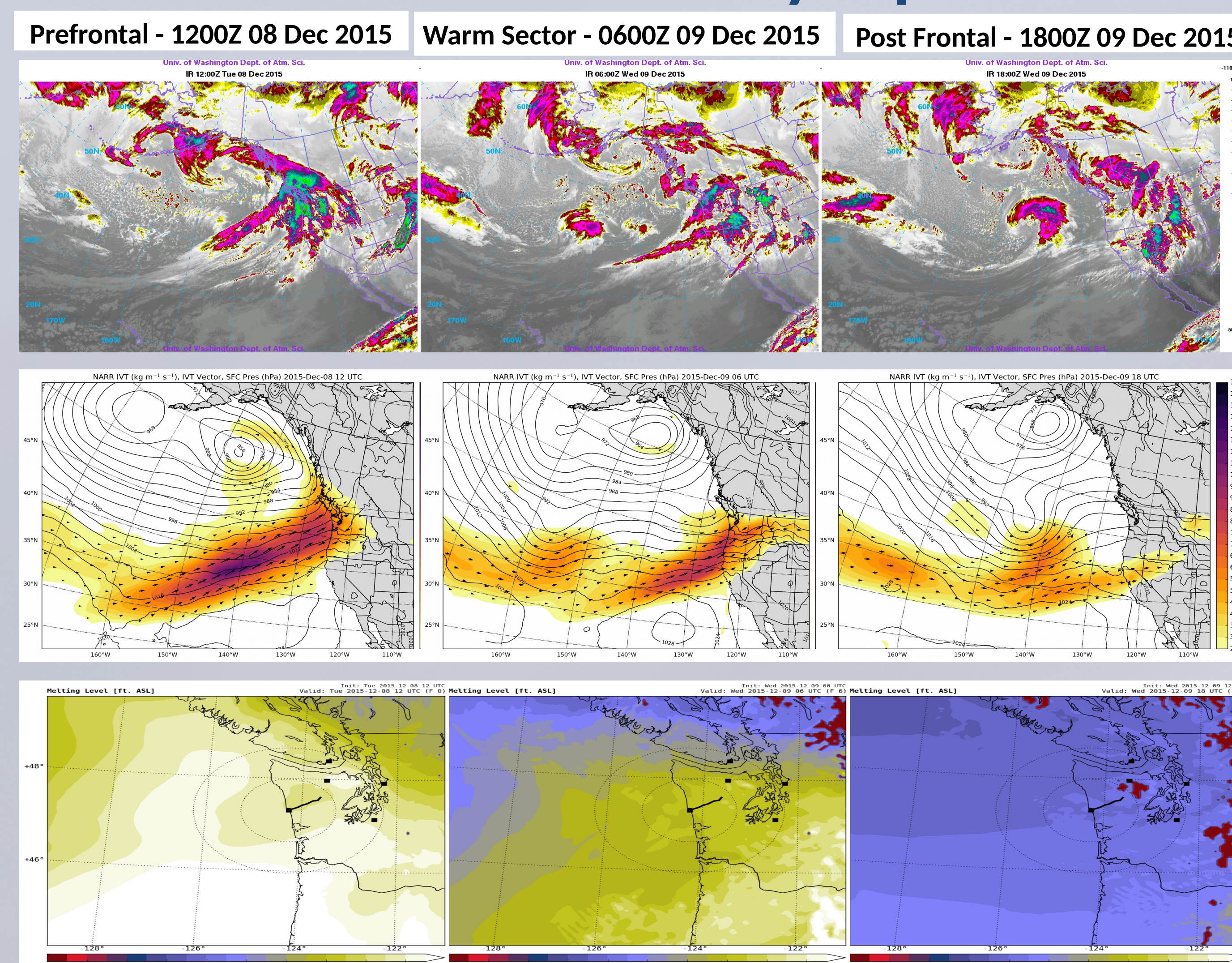
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OLYMPEX Goals & Field Campaign Overview

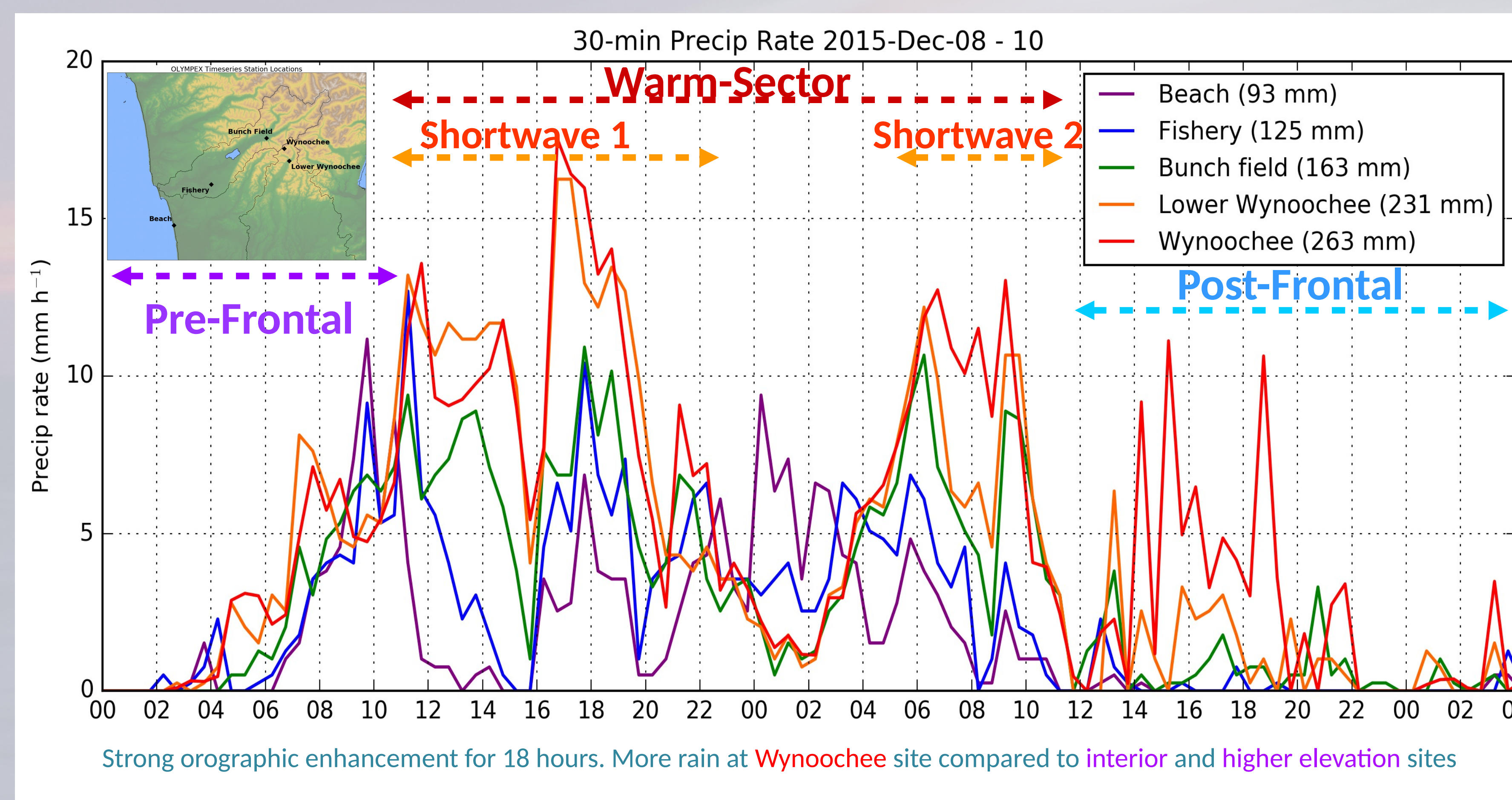
- Physical validation and verification of precipitation measurements by the GPM satellite.
- Measure precipitation processes and their modulation by synoptic conditions and complex terrain.
- OLYMPEX regions included ocean, windward side, high terrain and leeside and the Quinault and Chehalis river basins
- NPOL radar on coast sampled ocean and windward side, the Doppler on Wheels (DOW) sampled up the Quinault Valley. Both radars were supported by a ground network of disdrometers, rain gauges and MRRs.

Dec 8th -10th Synoptic Overview



- Atmospheric river event which includes pre-warm front, warm-sector, and convective Post-frontal conditions.
- Warm-sector contains two embedded shortwaves with an Intermediate period of blocked flow.
- Melting level remains high for much of the event, with a sharp decrease in the Post-Frontal Sector.

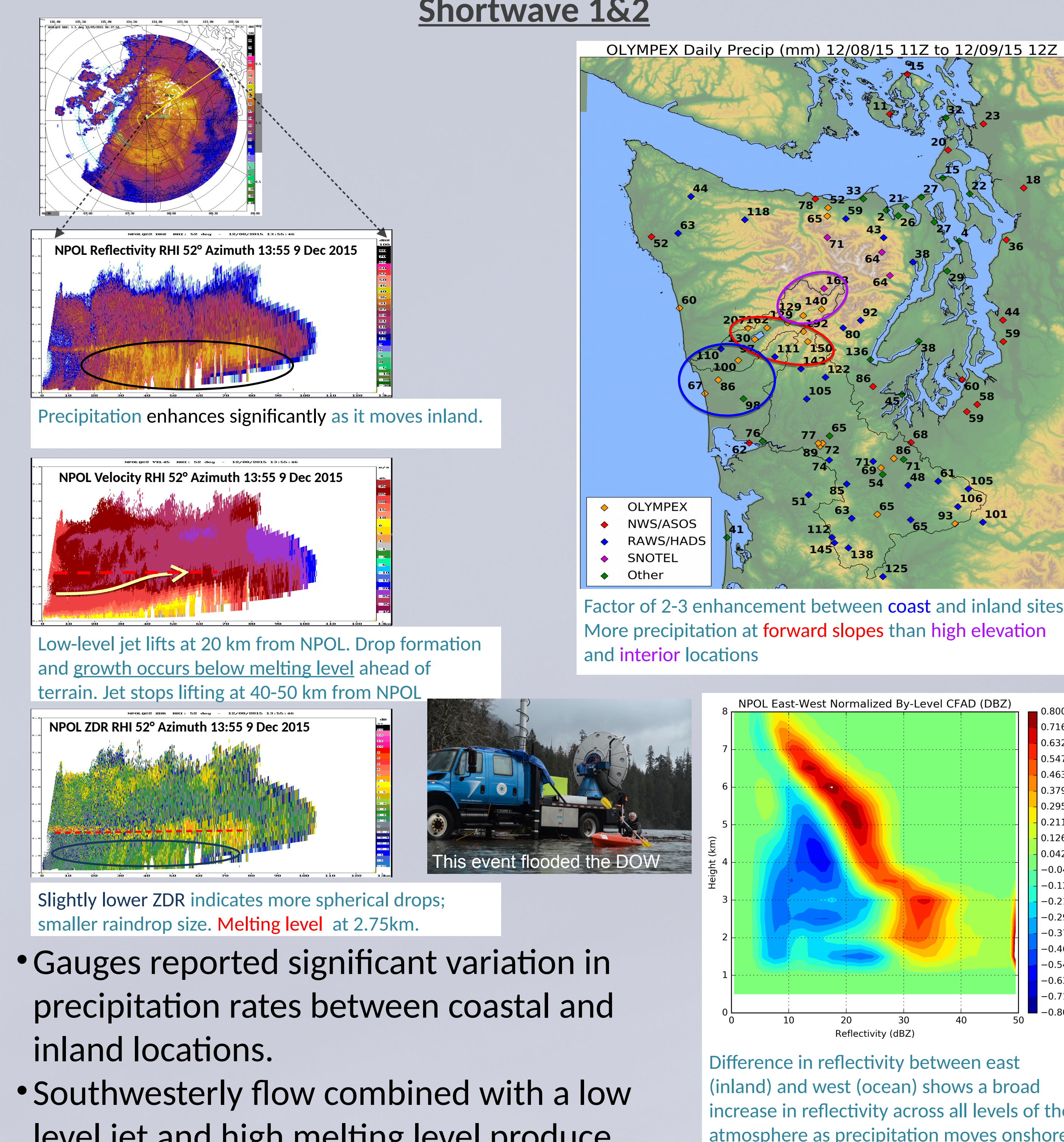
Event Precipitation Time-Series



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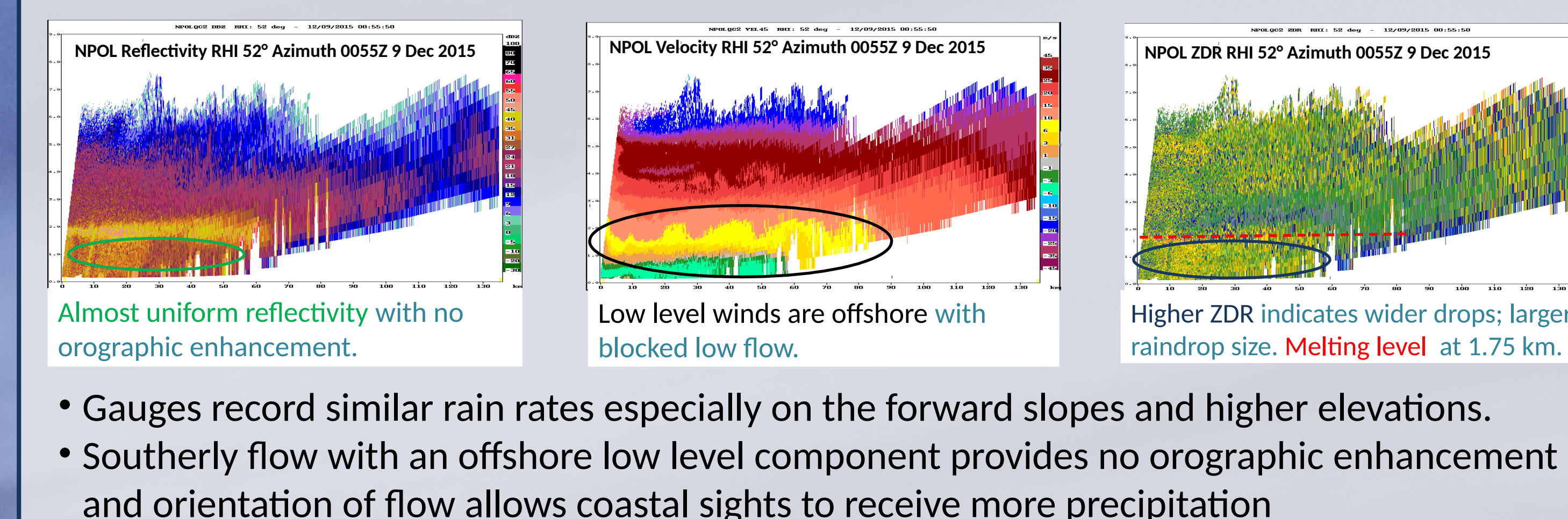
Warm-Sector Precipitation

Shortwave 1&2



- Gauges reported significant variation in precipitation rates between coastal and inland locations.
- Southwesterly flow combined with a low level jet and high melting level produce strong orographic enhancement along the windward slopes of the Olympics.

Intermediate Period Dec 8th 21Z – Dec 9th 5Z



- Gauges record similar rain rates especially on the forward slopes and higher elevations.
- Southerly flow with an offshore low level component provides no orographic enhancement and orientation of flow allows coastal sites to receive more precipitation

5.

Summary

- Deep, stratiform precipitation with a high melting level and low level jet produce strong orographic enhancement through warm rain processes along initial windward slopes.
- Post-frontal conditions with a low melting level and convective cells are associated with a greater degree of enhancement over interior locations.
- Pre-frontal and blocked flow conditions show no significant level of enhancement between coastal and inland sites.

Acknowledgments

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