

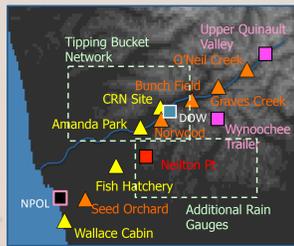


147 OLYMPLEX: Ground Validation Field Campaign Fall 2015/Winter 2016 on the Olympic Peninsula

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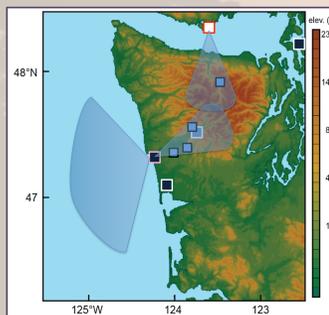


Ground Network



- Installations along the Quinault River Valley to document precipitation enhancement by terrain and to support NPOL measurements
 - Low Elev. With Power – can have full suite of instruments, Parsivel, 2DVD, MRR, rain gauge
 - Low Elev. Without Power – can only have Parsivel and rain gauge powered by battery and solar panel
 - High Elev. With Power – need instruments that can operate in snow – PIP, Hotplate, Pluvio, Parsivel, MRR
 - High Elev. Without Power – can only have Parsivel, and Pluvio powered by bank of batteries and solar panels
- Rain gauge networks sample precipitation at a variety of elevations
 - Across ridge between Quinault and Queets Rivers
 - In Upper Wynoochee and Chehalis River basins

Radar Network



Scan Strategies

- NPOL/D3R: RHIs up Quinault Valley and over ocean with PPIs interspersed every 20 minutes.
- DOW: Placed in Quinault valley to document precipitation growth 'under' NPOL Beam.
- X-Band: Scan 'Lee side' transition (RHIs)
- MRRs: 3 placed in Quinault to document precipitation growth in lowest levels. 1 placed on Hurricane Ridge near Canadian X-band.
- WSR-88D: NWS Operational Radars, PPI scans.



Aircraft



DC-8

- Will fly satellite simulator instruments
- Flight patterns over ocean and land, including over NPOL and ground network
- Dropsondes over the ocean
- Dates of operation: Nov 10 – Dec 22, 2015

ER-2

- Will fly satellite simulator instruments
- Flight patterns over ocean and land, including NPOL and ground network
- Dates of operation: Nov 17 – Dec 15, 2015

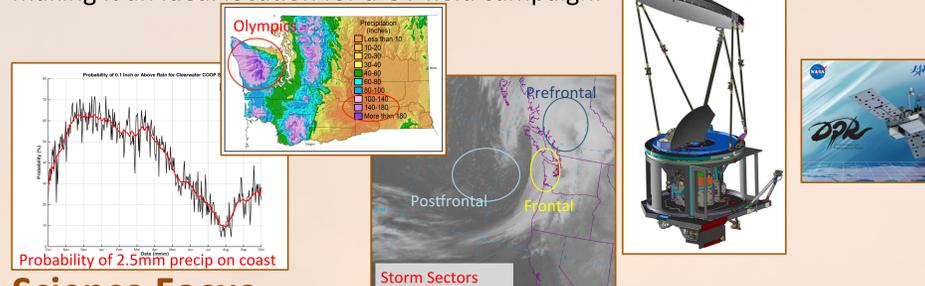
Citation

- Will fly microphysical instruments
- Flight patterns over ocean and land
- Must fly 2000' above highest terrain feature
- Hope to fly above and below bright band
- Dates of operation: Nov 10 – Dec 22, 2015



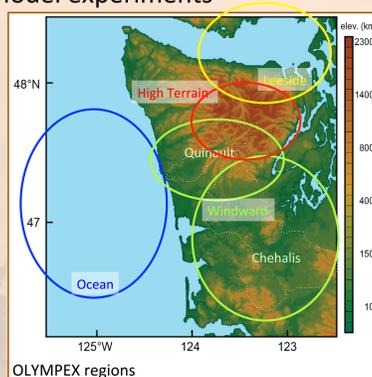
OLYMPLEX

The Olympics Measurement Experiment (OLYMPLEX) is a Ground Validation (GV) field campaign for the validation and verification of precipitation measurements by GPM to be conducted from Nov. 2015 through Feb. 2016 on the Olympic Peninsula. It is situated within an active mid-latitude winter storm track and reliably receives over 2500 mm of annual precipitation. In one compact area, the Olympic Peninsula ranges from ocean to coast to high terrain making it an ideal location for a GV field campaign.

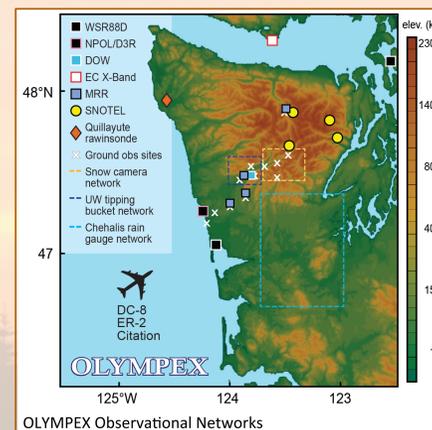


Science Focus

- Physical validation of rain and snow algorithms for the GMI and DPR
- Observe midlatitude winter storms and their sectors as they progress from ocean to coast to windward slopes to leeside
- Observe modification of precipitation processes by terrain
- Observe snowpack accumulation and melt off
- Hydrological response
- Model experiments



OLYMPLEX regions



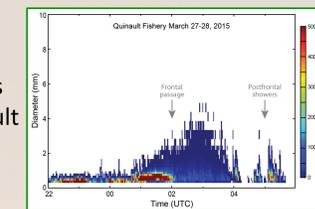
OLYMPLEX Observational Networks

Field Campaign Overview

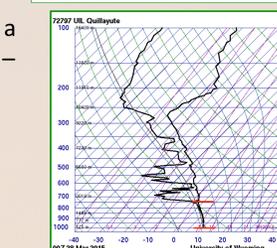
- OLYMPLEX regions include ocean, windward side, high terrain and leeside and the Quinault and Chehalis river basins
- NPOL radar on coast samples ocean and windward side, supported by a ground network of disdrometers, rain gauges and smaller radars
- Seasonal accumulation of the snowpack from SNOTEL and snow cameras
- Canadian X-band radar on Vancouver samples the leeside, supported by disdrometers and rain gauges
- Raingauge network in Chehalis river basin
- Aircraft measurements by DC-8, ER-2 and Citation over all regions
- Environmental characteristics documented by dropsondes (DC-8) and rawinsondes at UIL, NPOL and X-band locations
- High resolution modeling (up to 1.3 km) over entire region

Rain Measurements

- Rain measurements will be made with rain gauge networks and disdrometers at a variety of elevations in the Quinault and Chehalis river basins.
- Results from early installation at Quinault Fisheries reveal variations in microphysical characteristics in prefrontal and postfrontal regimes for a weak frontal cyclone that occurred 27 – 28 March 2015
- In prefrontal sector, there were very small drops that formed in a warm saturated layer, similar to those described by White et al. (2003)
- Frontal and postfrontal sectors have a broader dropsize spectrum.



Dropsize distribution measured by a Parsivel installed at the Quinault Fisheries (see map to left)

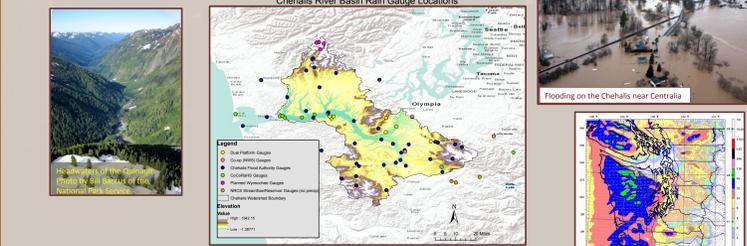


Sounding at UIL showing a warm saturated layer below the melting level taken at 00 UTC 28 Mar in the prefrontal sector

Snow Measurements

- Snowpack measurements using SNOTEL sites and snow camera network
- Microphysical measurements at high altitude stations at Hurricane Ridge (elevation > 5000') and Neilton Point (elevation > 2000')
- Remote installations of Parsivel and Pluvio powered by bank of batteries and solar panels at Wynoochee Trailer site and Upper Quinault

Hydrology and Modeling



- The Quinault and the Chehalis basins will be the focus for hydrological response
- The Quinault is a narrow basin affected by both snow in the higher elevations and rain in the lower elevations. The Chehalis is primarily a rain-driven hydrological basin.
- The Chehalis will have a large network of a variety of gauges, from dual-tipping buckets to RAWs to CoCoRaHS sites
- High resolution numerical models will be used for operations support and for hydrological studies

Reference: White, A. B., P. J. Neiman and F. M. Ralph, 2003: Coastal orographic rainfall processes observed by radar during the California land-falling jets experiment. J. Hydrometeorol., 4, 264-282. Acknowledgements: This work was supported by NASA grants NN13AG71G and NN14A064G.