

Progress on CSET analysis

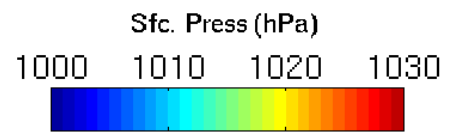
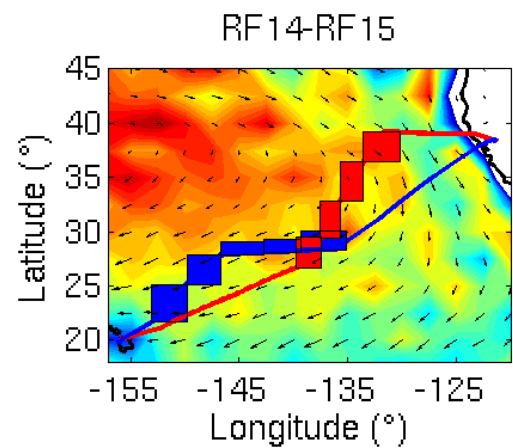
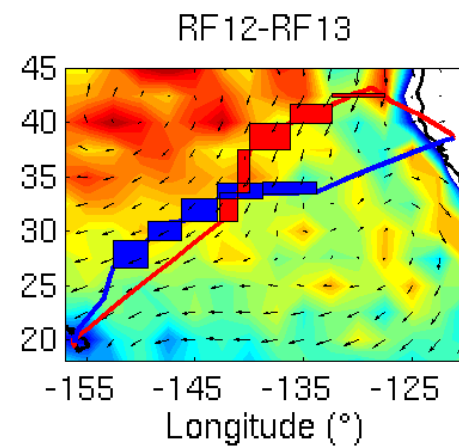
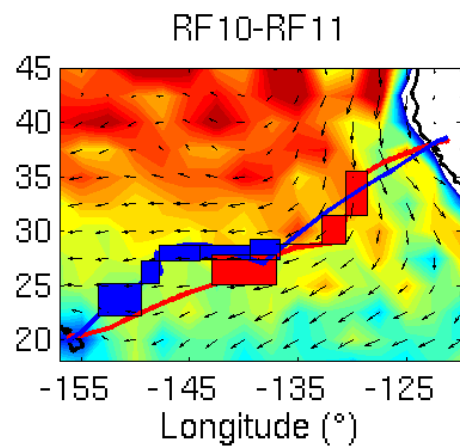
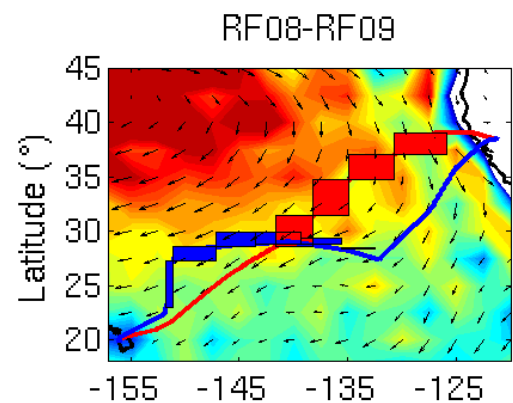
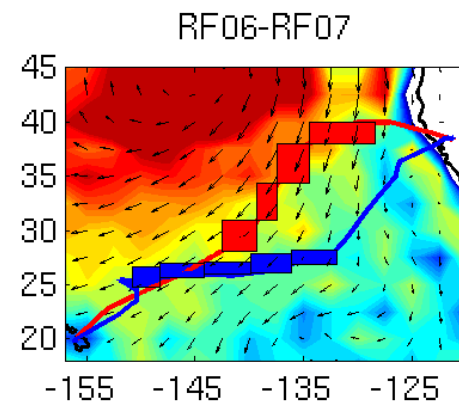
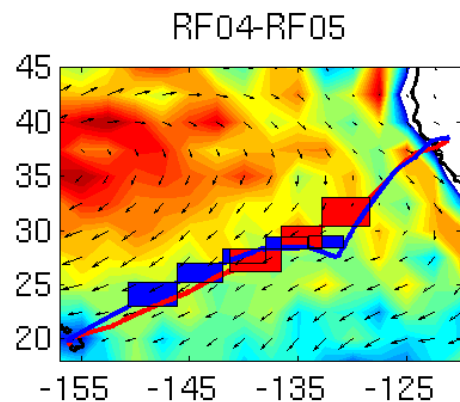
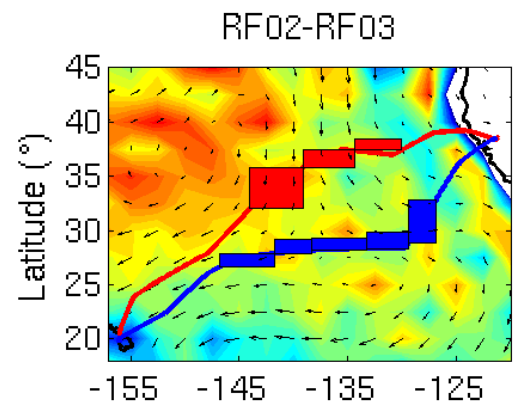
Virendra P. Ghatе and M. Christian Schwartz
Argonne National Lab

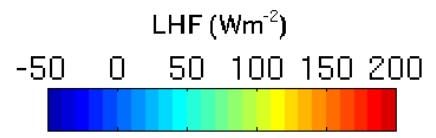
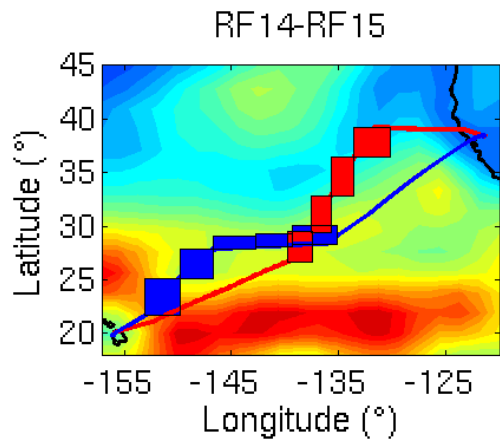
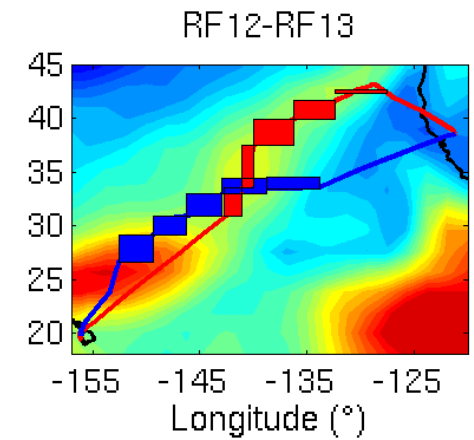
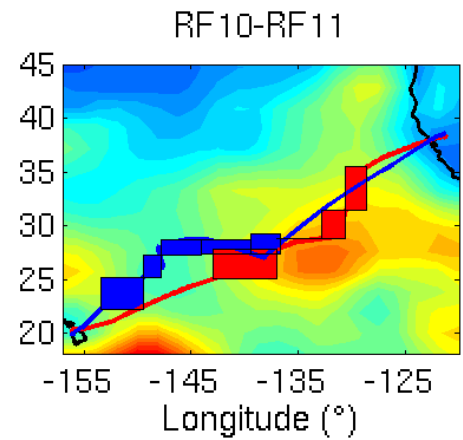
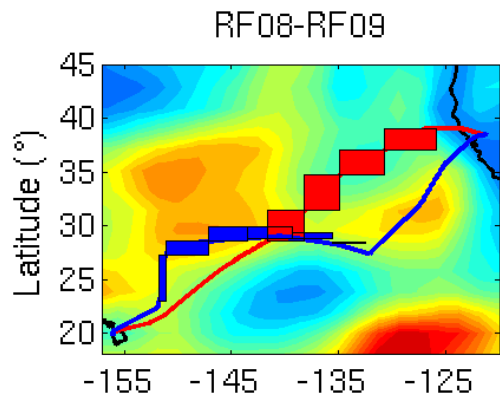
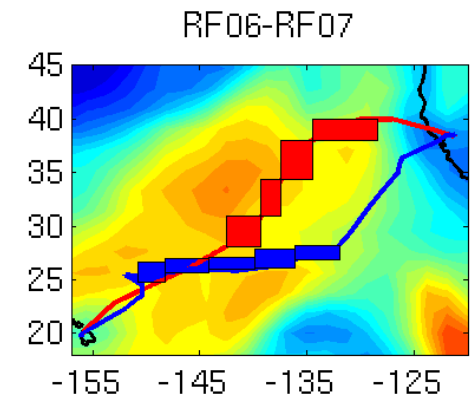
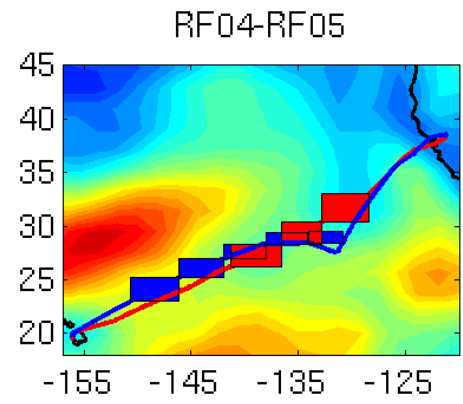
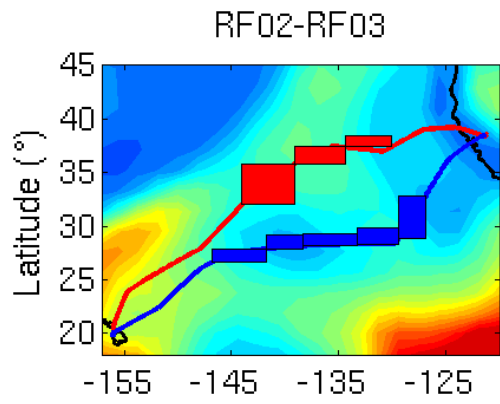
Objective

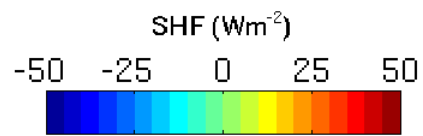
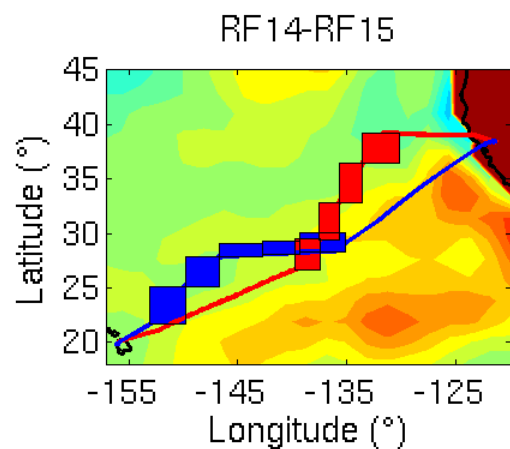
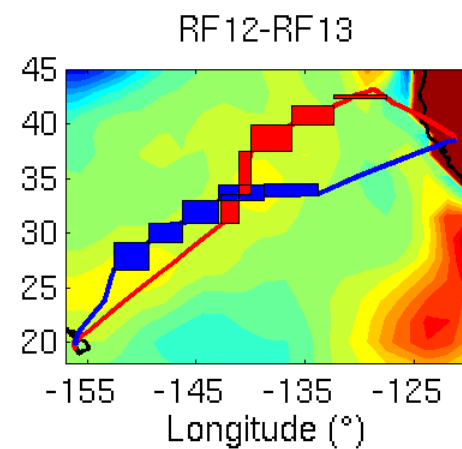
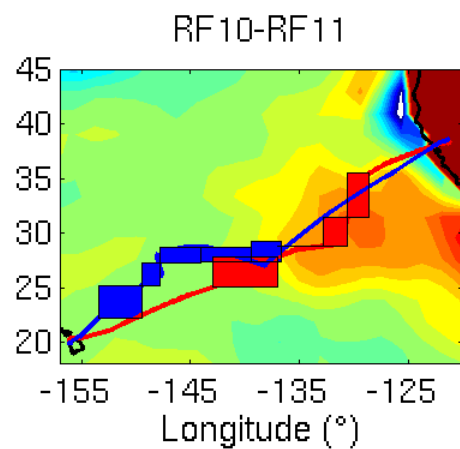
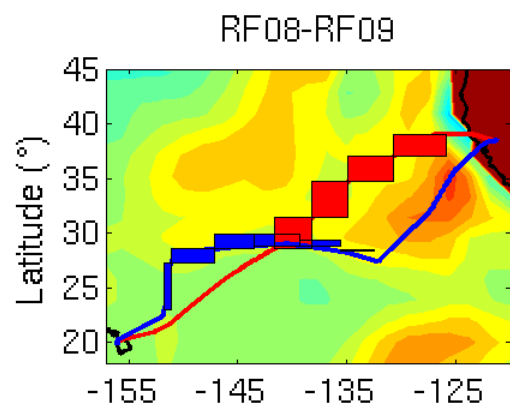
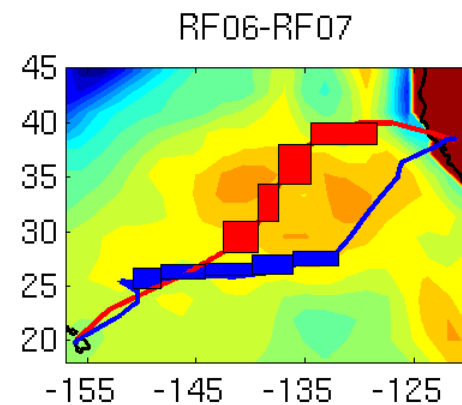
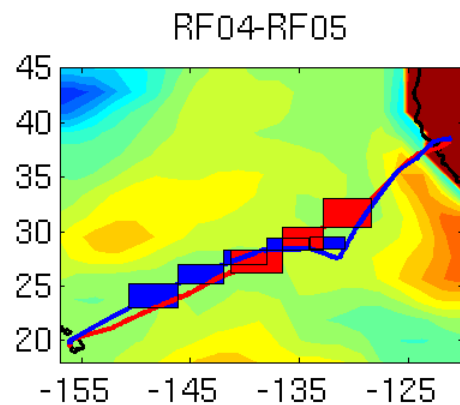
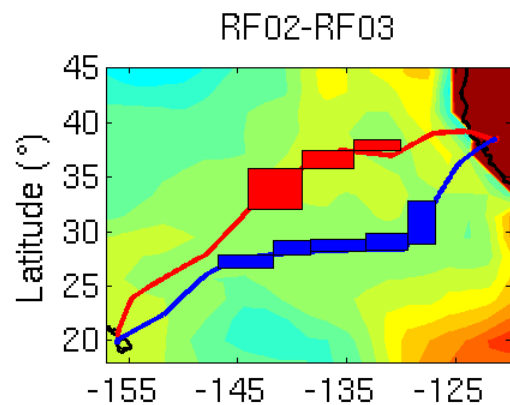
- Calculate budgets of moisture, liquid water static energy, and mass. - similar to Caldwell et al. (2005)
 - Average (total) entrainment rates for the transition.
- Calculate turbulence budgets, e.g. stress, w'^2 , TKE etc. - similar to Brost et al. (1981)
 - Entrainment, and relative contribution of mechanisms
 - Need to use high-resolution data

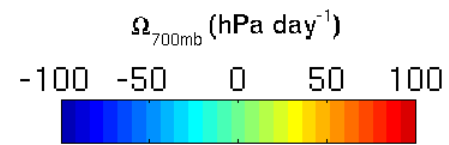
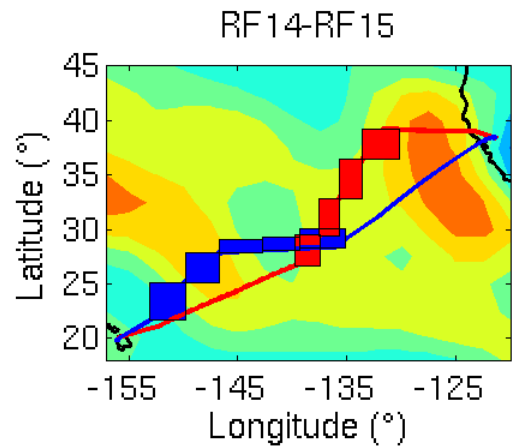
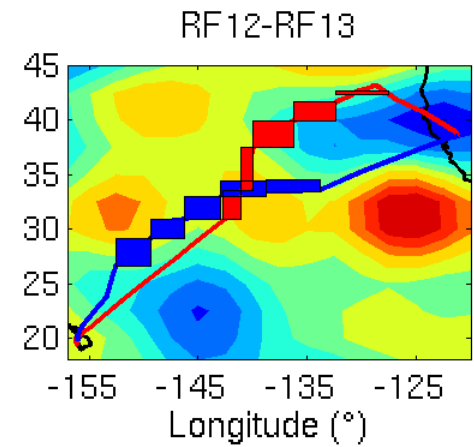
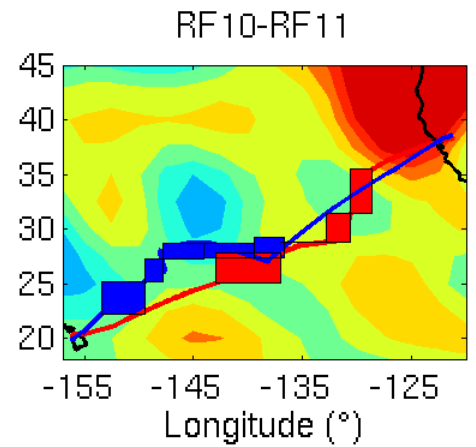
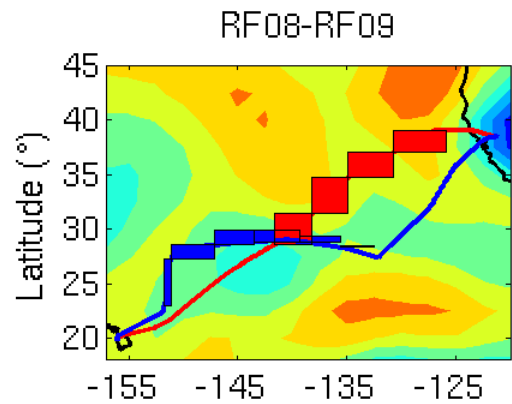
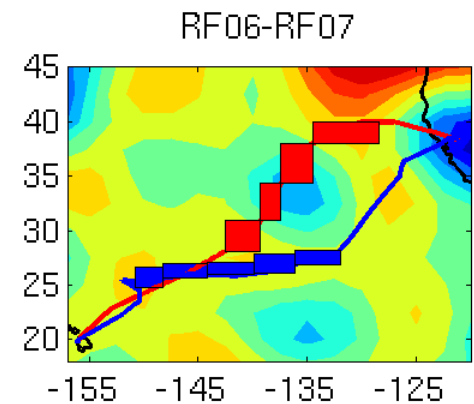
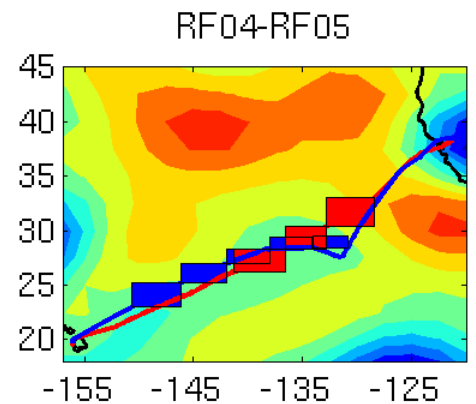
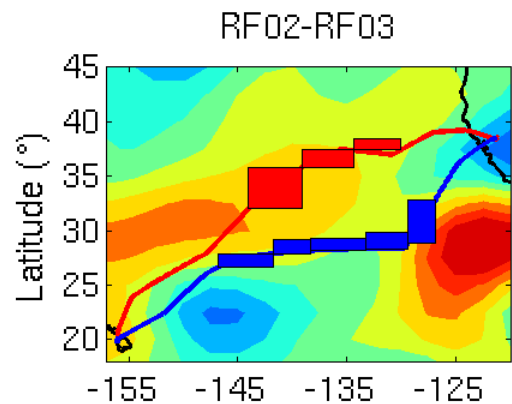
Accomplished so far

- Generation of a lookup table defining start and end times of all of the sequences "boxes" and individual legs.
 - Total 27 boxes sampled on the outbound flight
 - Total 36 boxes sampled on the inbound flight
- Identification of box-pairs for each transect.
 - Total of 18 air-masses sampled twice
- Archiving, reading, and plotting of NCEP reanalysis, aircraft, GVR, HCR, and HSRL data for the study period.



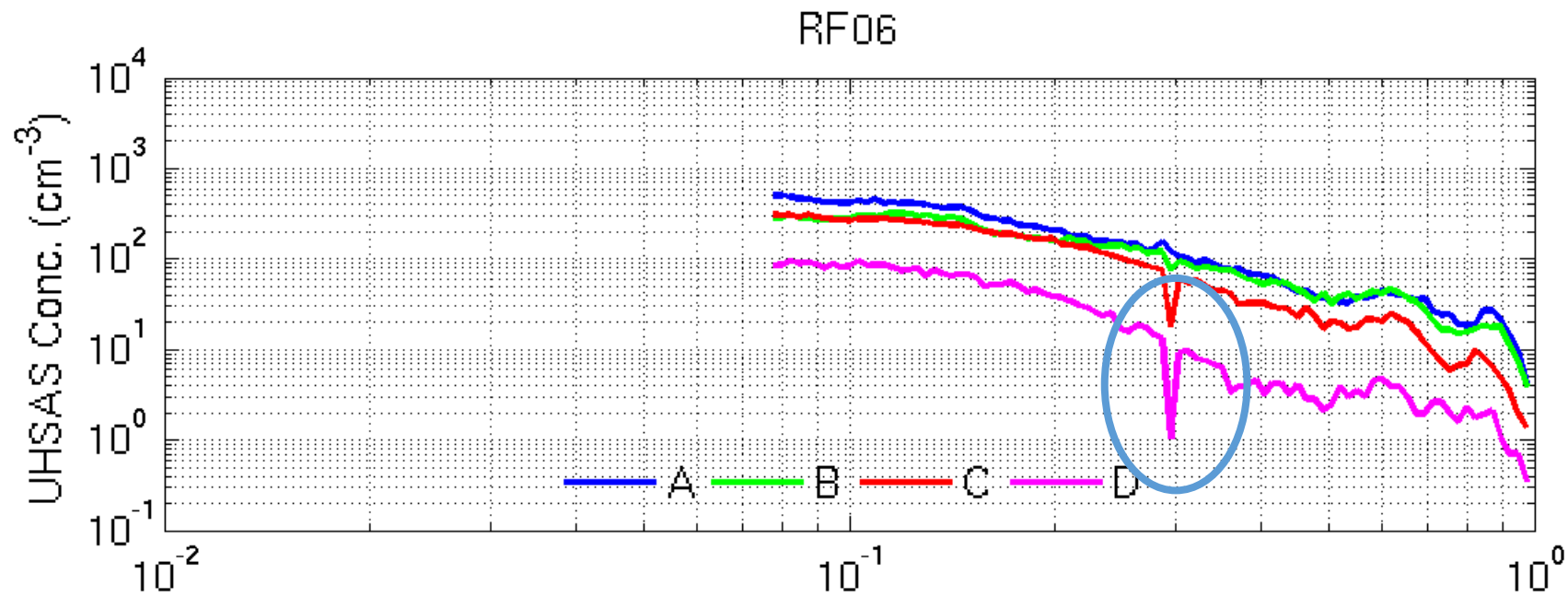




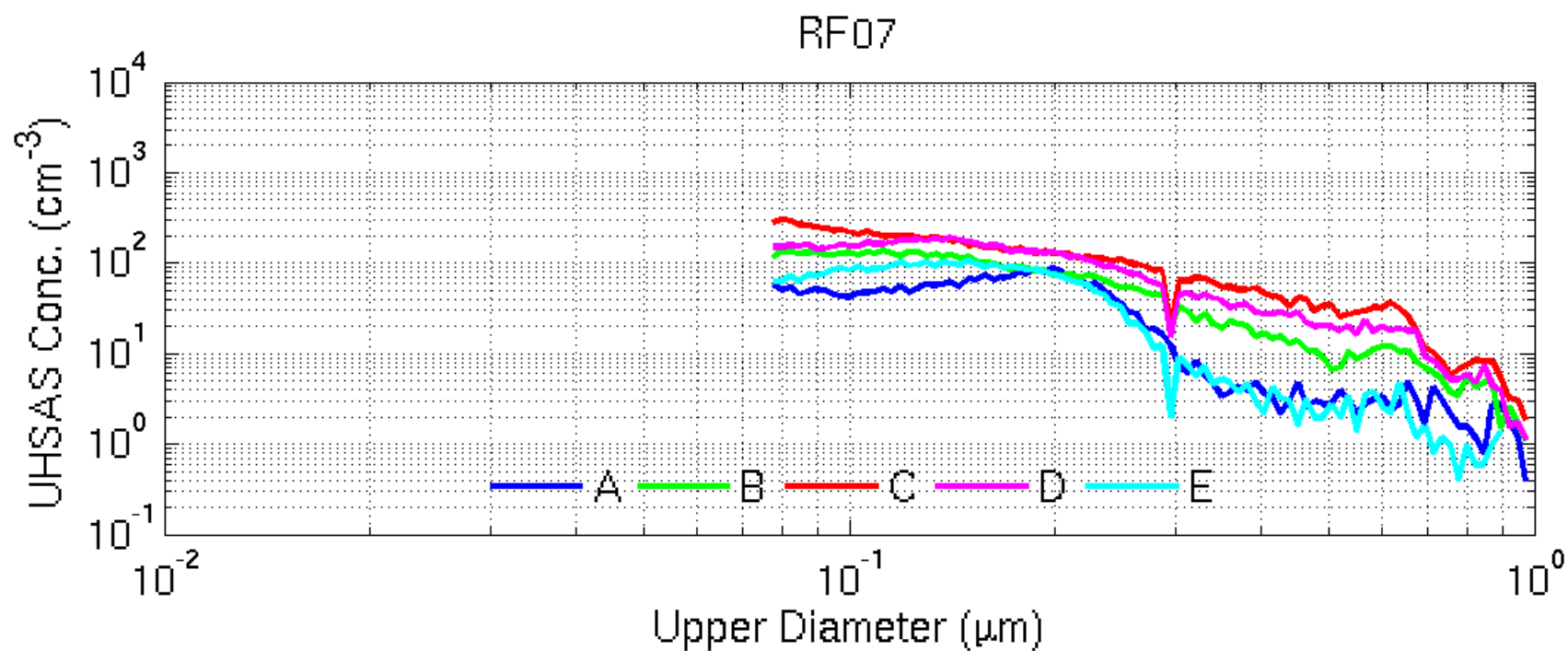


Individual Leg comparisons

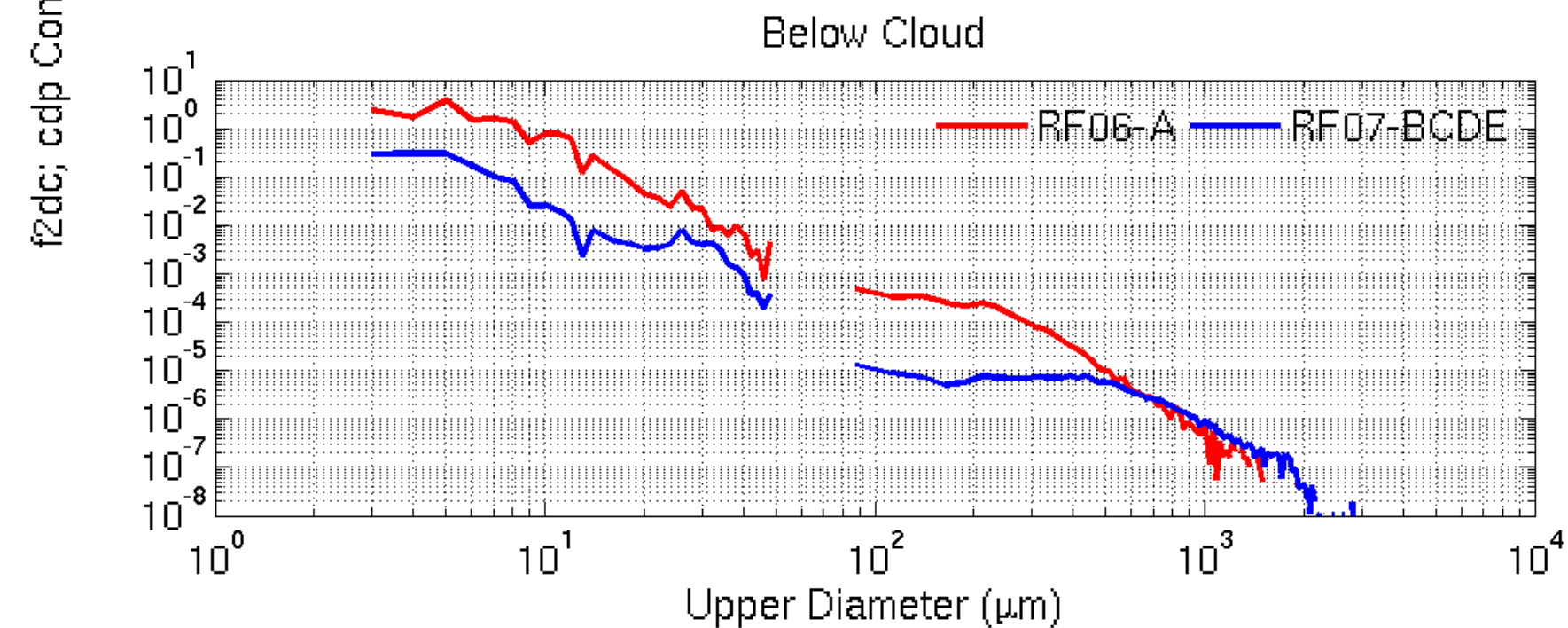
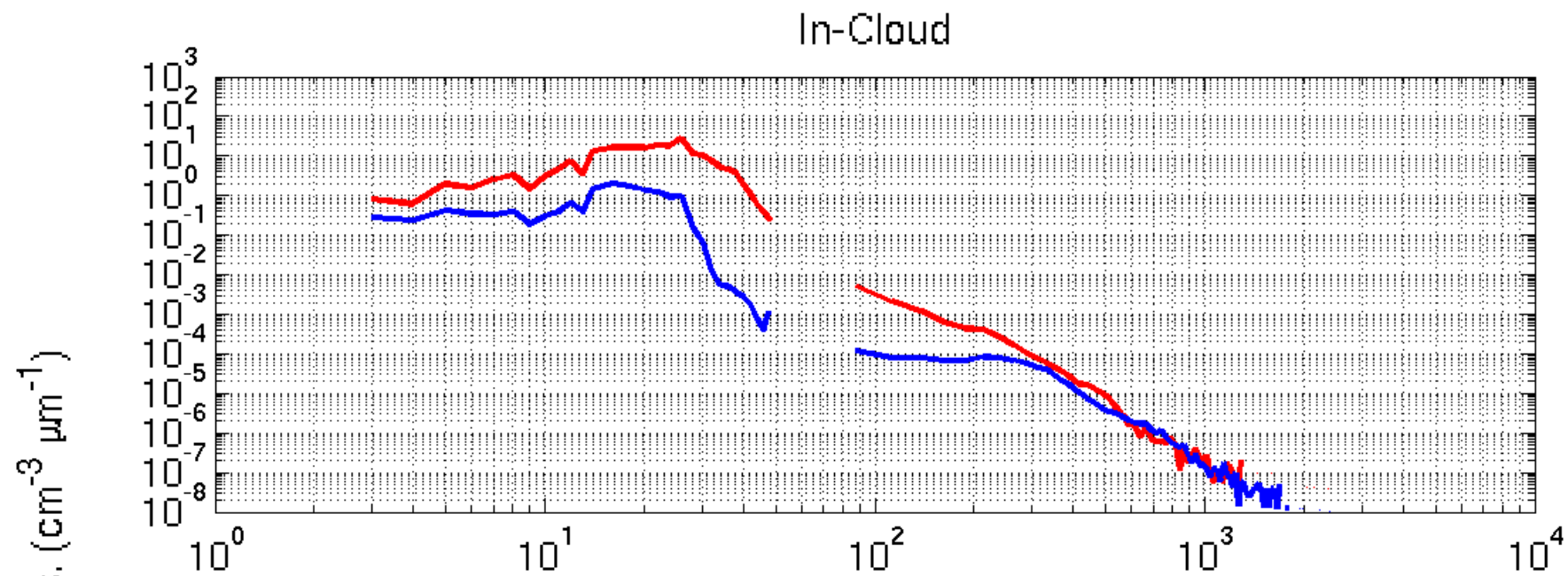
- Made initial plots for comparing soundings, individual legs and cloud structure between inbound and outbound flights.
 - Gather overall picture assess data quality
- Made initial plots and tables for comparing advected boxes.
 - Ongoing and will be used to identify boxes suitable for calculating budgets.



UHSAS size distribution from surface leg for RF06 and RF07



Also present in several other flights



- Drops larger than 1 mm observed regularly.
- Consequences for the Mie-notch.

Budget analysis

Precipitation Flux;
HCR+HSRL

Residual;
Inversion
strength from
porpoise

NCEP

Differences between
advected boxes

$$\hat{p}_i \left[\frac{\partial \langle q_t \rangle}{\partial t} + \langle \mathbf{v} \cdot \nabla_h q_t \rangle \right] - g \frac{\text{LHF}}{L} - g F_P(0) - \hat{\omega}_e \Delta q_t$$

$$= [\langle q_t \rangle - q_{t-}] \mathbf{v} \cdot \nabla_h \hat{p}_i$$

Zero

Advection of boundary
layer inversion strength;
Zero.

- Follow similar procedure for S_1 .
- Calculate for few boxes that exhibit interesting changes.
- Classify the retrieved w_e according to forcing.

Ongoing work

- Finish generating box comparisons
 - Plots done!
 - Tables in progress
- Calculate budgets and entrainment rates