Objective: Large-scale distribution of cloud ice water amount (1) is required for deriving cloud water advective tendency as forcing term for single-column models, (2) can be used to validate cloud resolving and global climate models, and (3) is extremely useful for understanding cloud microphysical and precipitation processes. While excellent in quality, surface cloud radar observations provide only single-point measurements, thus unable to be used to derive areal cloud ice distributions. Satellite observations, however, can cover a large area in a very short time period while having limited ability in resolving vertical cloud distributions. In this study, we take the advantages of both satellite and surface cloud radar observations. By combining the two, we derive large-scale 3-D ice water contents in a 10° x 10° area surrounding ARM sites. In this poster, we show the results during TWP-ICE at Darwin site, as well as those during March 2000 at SGP site for comparison.

Retrieval Algorithm:

IWP Distribution (10° x 10°)
- TWP-ICE 40-Day Mean
- SGP-32k 30-Day Mean

IWP – Cloud Top Height Relations
- TWP-ICE
- SGP-32k

Mean IWC Profiles
- Support: ARM DE-FG02-03ER63526

Conclusions:
- Combining satellite and surface radar observations enables us to retrieve 3-D cloud ice water contents over large-scale surrounding ARM sites (10° x 10°)
- Retrievals are validated by MMCR data for TWP-ICE
- Characteristics of cloud ice water differ between TWP-ICE and SGP March 2000

Data available: PI products at ARM Website, as well as http://cirrus.met.fsu.edu

Large-scale 3-D Cloud Ice Water Features Determined by Combining Satellite and Surface Measurements during TWP-ICE

G. Liu and E.-K. Seo, Florida State University