P2.13 HYDROLOGICAL PRODUCT COMPOSITES FROM AMSU

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1. INTRODUCTION

The Advanced Microwave Sounding Unit - A and Unit - B (AMSU-A and AMSU-B) are multi-channel microwave radiometers flown on board of the NOAA polar orbiting satellites NOAA-15, NOAA-16, and NOAA-17. AMSU-A has 15 channels with frequencies ranging between 23.8 and 89.0 GHz, and AMSU-B has 5 channels with frequencies ranging between 89.0 and 183.3 GHz. The measurements from the 5 window channels out of the 20 AMSU channels provide us with an opportunity to develop a new set of surface hydrological products. This prospect was the motivation for our project, the Microwave Surface and Precipitation Products System (MSPPS) (Ferraro et al, 2002). The current MSPPS product suite includes rain rate (RR), total precipitable water (TPW), cloud liquid water (CLW), ice water path (IWP), snow cover (Snow), sea ice concentration (Sice), surface temperature (Tsfc), and emissivity at 23.8 GHz, 31.4 GHz, and 50.3 GHz. These products along with the antenna temperatures of the 20 AMSU channels are produced at near real-time from AMSU measurements and output in both swath files and polar stereographic map files. The three satellites carrying AMSU instruments fly at approximately four hours apart (NOAA-15: 7:30 AM/PM LST; NOAA-16: 1:30 AM/PM LST; NOAA-17: 10:30 AM/PM LST), i.e. there are 6 samplings of each earth location on each day barring the gaps between orbits. This data coverage makes it possible to study the spatial-temporal variation of hydrological products at any earth location.

2. AMSU PRODUCTS

An array of tools has been developed for the MSPPS project to monitor, validate, and study the products. The following are some examples shown on the MSPPS project web site (http://orbit-net.nesdis.noaa.gov/arad2/MSPPS):

- Yesterday's global product composites.
- Two-day loop of yesterday's global product composites from all three satellites.
- Pentad and monthly climate product composites.
- Animations of pentad and monthly climate product composites.

Yesterday's and near real-time images of individual products are also featured on the web site. This poster, however, will focus on the presentation of AMSU product composites. The daily global product composite includes RR, TPW, CLW, IWP, Snow, Sice, and Tsfc (Figure 1). It reveals the relationships among the cloud products and serves as a convenient tool to monitor the MSPPS system. The two-day loop of yesterday's global product composites is composed of 12 images from the three satellites from the last two days. It displays the short-term evolutions of large-scale weather systems. The pentad and monthly climate product composites include RR, TPW, Snow, Sice, and Tsfc (Figure 2 and Figure 3). They are useful tools for climate studies. The animated pentad and monthly product composites track the seasonal variations and long-term trends of hydrological products such as rain rate and snow. These composites will be presented electronically at the conference.

3. REFERENCES

Ferraro, R.R, F. Weng, N.C. Grody, I. Guch, C. Dean, C. Kongoli, H. Meng, P. Pellegrino and L. Zhao, 2002b: NOAA Advanced Microwave Sounding Unit (AMSU) hydrological products. *In press, EOS, Trans. Of Amer. Geophys. Union.*

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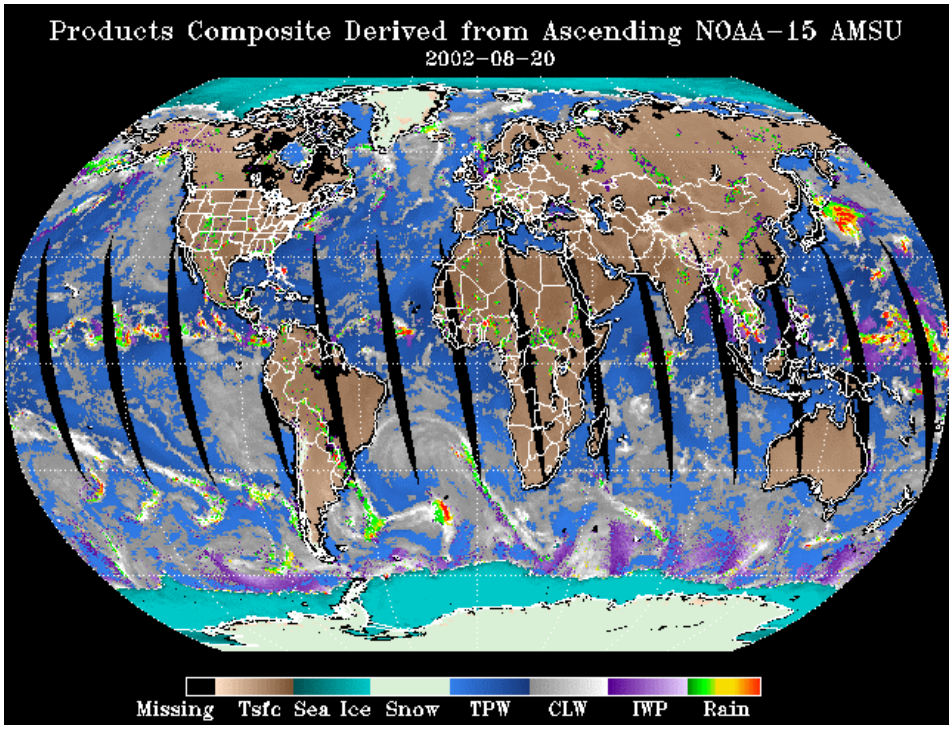

Figure 1 - Daily MSPPS global product composite derived from NOAA-15 AMSU

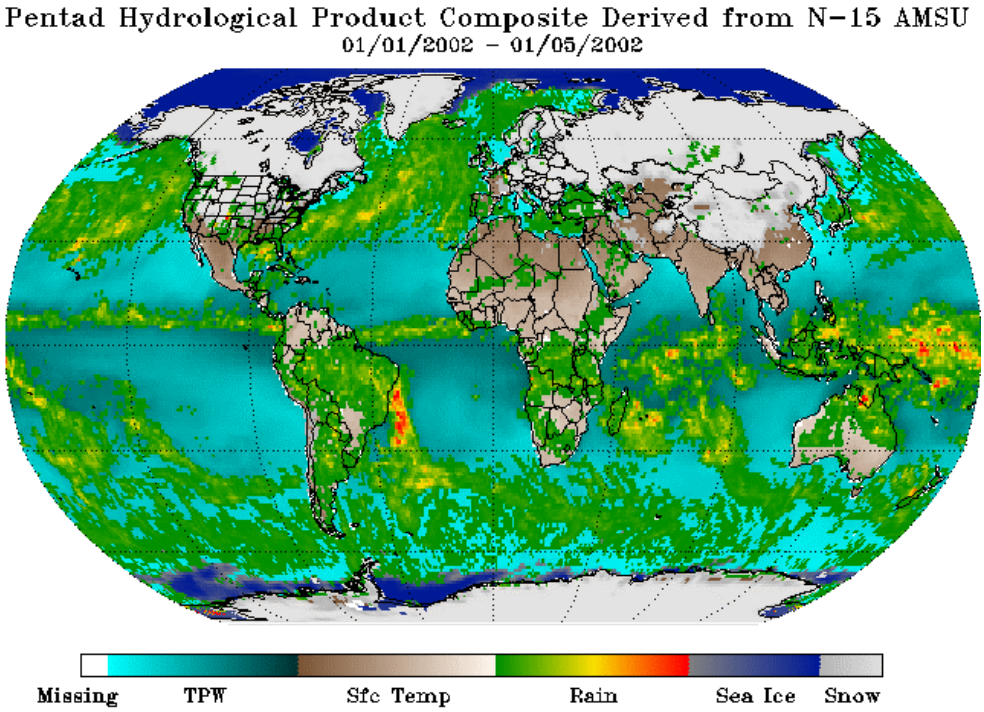

Figure 2 - Pentad climate product composite from NOAA-15 AMSU

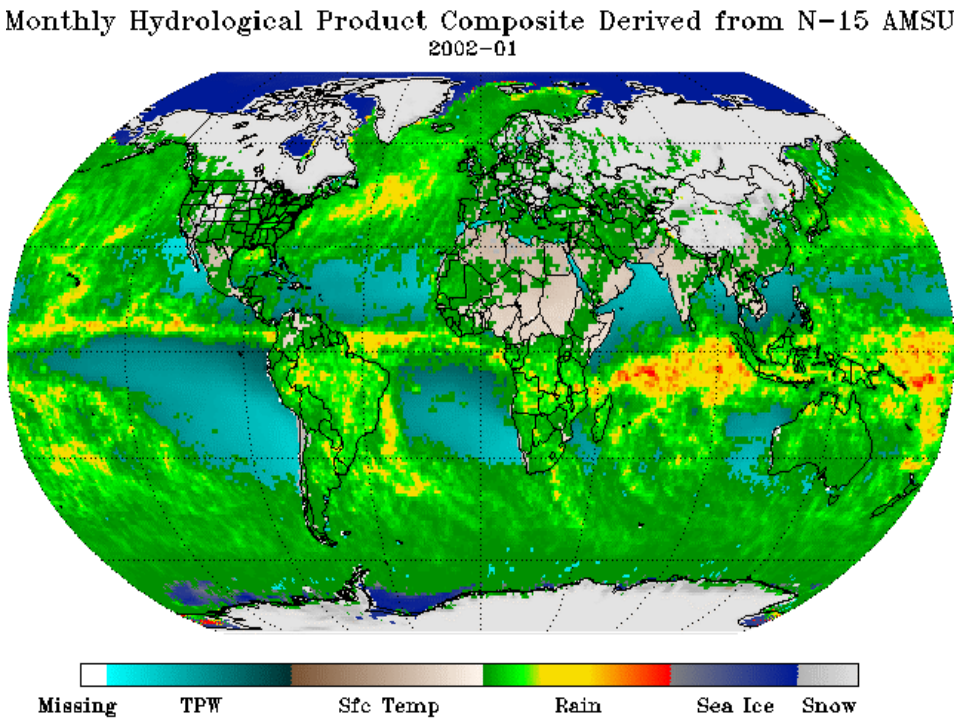

Figure 3 - Monthly climate product composite from NOAA-15 AMSU