P2.12 DIURNAL CYCLE OF HYDROLOGICAL PARAMETERS AS OBSERVED FROM THE NOAA ADVANCED MICROWAVE SOUNDING UNIT

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1. INTRODUCTION

With the launch of the NOAA-17 satellite in June 2002, there now exists a three satellite constellation of measurements from the Advanced Microwave Sounding Unit (AMSU) which are making global measurements at approximately every four hours (NOAA-17 joins NOAA-15 and NOAA-16). The table below gives the local overpass times of each of the NOAA satellites that contain the AMSU sensor suite, which consists of AMSU-A (15 channels spanning 23 - 89 GHz) and AMSU-B (5 channels spanning 89 - 183 GHz).

Satellite	Ascending Overpass Time (LST)	Descending Overpass Time (LST)
NOAA-15	1930	0730
NOAA-16	1400	0200
NOAA-17	2200	1000

Scientists at the NOAA/NESDIS have been generating operational hydrological products from the AMSU for the past three years in a system known as the Microwave Surface and Precipitation Products System (MSPPS) (Ferraro et al, 2002). The MSPPS product suite includes global rain rate and ice water path; land-based surface temperature, emissivity and snow cover; ocean-based sea-ice concentration, cloud liquid water and total precipitable water.

It is the purpose of this paper to utilize the 4-hour sampling from these satellites to explore the diurnal cycle of a number of these parameters on various time scales (daily, pentad and monthly). We hope to employ color animations in an electronic poster at the conference to demonstrate the robustness of the MSPPS products. Furthermore, the readers are encouraged to refer to the paper (P2.13) by Meng and Ferraro (2002) in these proceedings to learn more about the MSPPS web site and its features.

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2. EXAMPLES OF DIURNAL VARIATIONS

As part of the routine monitoring and QC of the MSPPS, zonal mean averages of all of the products are computed and illustrated as a continuing time series (Meng and Ferraro, 2002). These can be used to perform initial investigations on the diurnal variation of the various hydrological parameters. For example, Figure 1 shows the global mean land rainfall rate for each of the NOAA satellites, stratified by orbital node (refer to the table for the times). A pronounced diurnal cycle is evident, with maximum rainfall occurring late in the day (1930 local time, LST) and a minimum in the morning (between 730 and 1000 LST). For land surface temperature (Figure 2), a much clearer diurnal cycle is evident, as in this case, we look at the 0 - 30 degree north zonal average. As expected, the NOAA-16 ascending node (1400 LST) shows the highest temperature, while the NOAA-15 descending time (0730 LST) shows the minimum.

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. *EOS, Trans. Of Amer. Geophys. Union,* **83,** 429-437.

Meng, H. and R.R. Ferraro, 2002: Hydrologic product composites derived from AMSU. *Proceedings of the 12th AMS Conference on Satellite Meteorology and Oceanography, Long Beach, CA, 9-13 February 2003.*

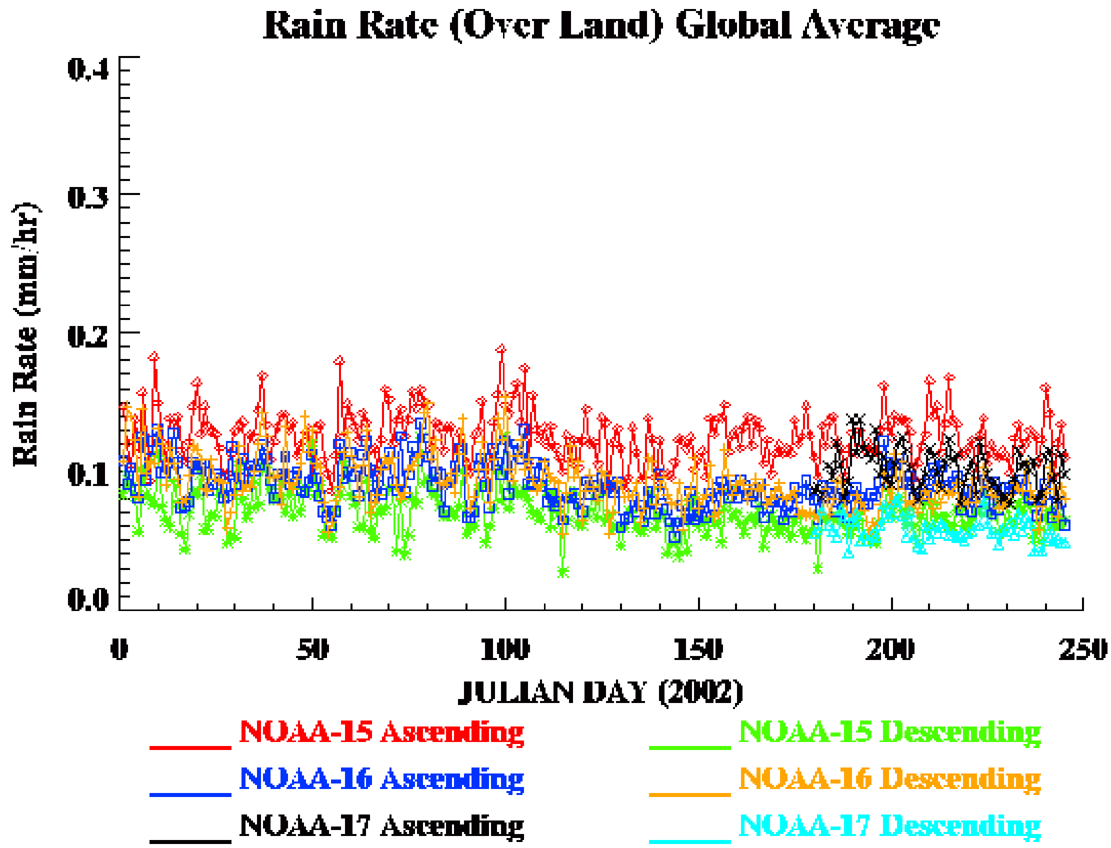

Figure 1 - Global mean land rainfall rate (mm/hr) for 2002 based on each of the three NOAA satellites and stratified by orbital node. Note that NOAA-17 measurements begin around day 180.

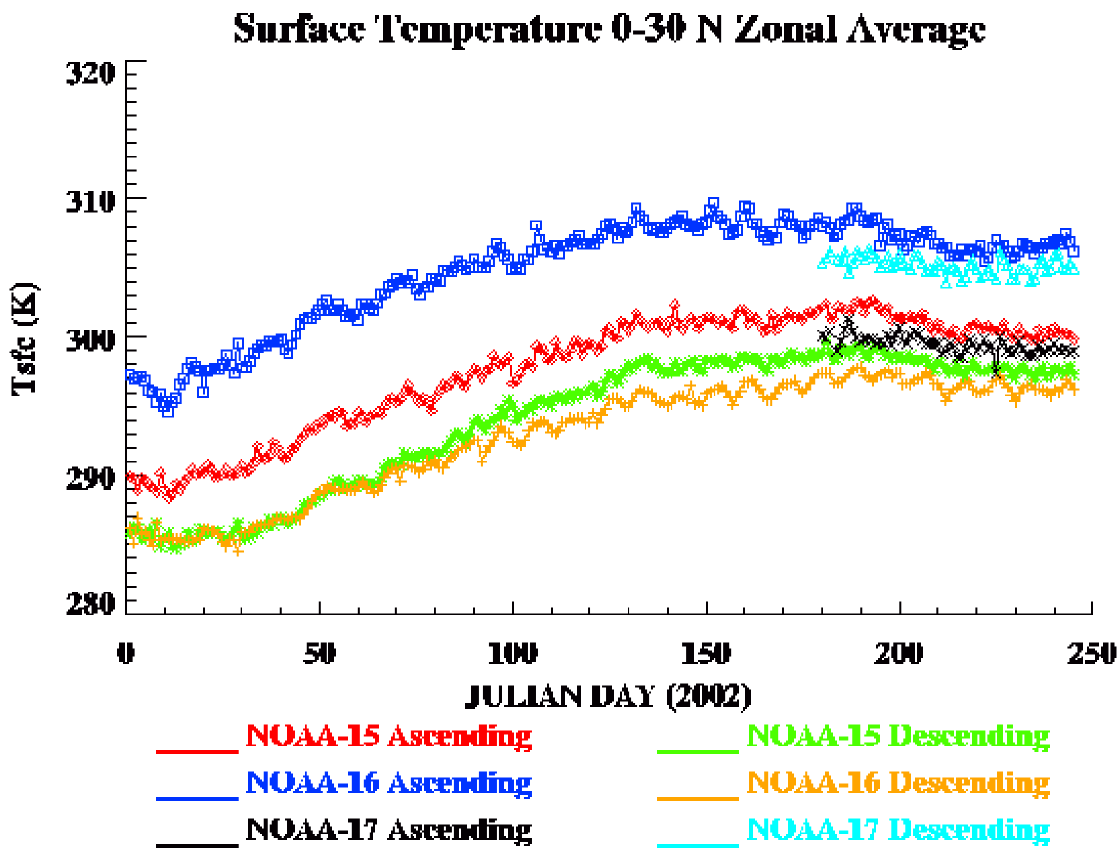

Figure 2 - Zonal (0 - 30 N) mean land surface temperature (Deg K) for 2002 based on each of the three NOAA satellites and stratified by orbital node. Note that NOAA-17 measurements begin around day 180.