### NESDIS ADVANCED-TOVS (ATOVS) SOUNDING PRODUCTS: SYSTEM-2005

#### Science Algorithm - discussion

**First Guess Temp and H2O:**
- Library Search technique replaced with AMSU based statistical regression:
  - \( F_{GOFEC}_{i,j} = (S_{yx}) (S_{xx} + q*I)^{-1} \)
  - \( \beta \) is predictor/predictor covariance matrix
  - \( S_{xx} \) is predictor matrix
  - \( q \) is stabilization factor; 0.95 for Temp., 0.005 for H2O

**Radiative Transfer (RT) Bias Adjustment:**
- Applied to sensor measurements to compensate for potential RT model bias in calculated first guess Btemp.

### Preliminary Validation / Results

**First Guess Temp and H2O:**
- Calculated from First Guess temperature and H2O using OPTTRAN-CRTM

**Retrieval Analytic Solution:**
- Applied to sensor measurements to compensate for potential RT model bias in calculated first guess Btemp.

**RT-Bias Coefficients with**
- AMSU-A
- AMSU-B
- HIRS

**MHS,** which is very similar to AMSU-B, and AVHRR instruments was tentatively scheduled for launch into an afternoon orbit (1330 ascending) on May 20, 2005. ATOVS and AMSU-B product systems are currently in an operational check-out phase with operational implementation of product systems expected within 30 to 90 days from launch.

#### Science Algorithm - discussion

**NS3P:** Mainly used for validation. Previous method only stored 6-hour forecasts at 250 km grid over two inhomogeneous layers (1000 to 700) and (700 to 300 mb). Now stores 3-hour forecast at 800 km grid for all available levels. Surface pressure to serve as input for retrieval.

**Limb Adjustment:**
- Same approach except measurement sample (1-level) expanded from 5 days to 30 days+

**Microwave Products:**
- Consistent with products from NESDIS operational Microwave Surface and Precipitation Products System (see Fucheng Weng), including microwave surface emissivity (possible use in guess and retrieval steps).

#### Science Algorithm - discussion

**NSPD:**
- First guess radiance temperature vector, RT bias calculated from guess (OPTRAN-CRTM) from

**Rg:**
- First guess radiance temperature vector, corrected (OPTTRAN-CRTM) for

**MHS:**
- Library Search technique replaced with AMSU based statistical regression:
  - \( F_{GOFEC}_{i,j} = (S_{yx}) (S_{xx} + q*I)^{-1} \)
  - \( \beta \) is predictor/predictor covariance matrix
  - \( S_{xx} \) is predictor matrix
  - \( q \) is stabilization factor; 0.95 for Temp., 0.005 for H2O