**Variability of the East Asian Mei-yu and Simulations and Prediction by the NCEP CFS**

Hui Gao¹, S. Yang², A. Kumar², Z.-Z. Hu³, B. Huang³, Y. Li¹, and B. Jha²

¹China Meteorological Administration; ²NOAA Climate Prediction Center; ³COLA

(gaohui@cma.gov.cn)

**What is the East Asia Mei-yu (EAMY)?**
- Heavy rainfall in June-July over the Yangtze and Huaihe River valleys of China, Korea, and southern Japan (27.5-40°N/110-140°E; Meiyu in China, Changma in Korea, and Baiu in Japan)
- Remarkable interannual variability
- Strong relation with flood/drought events
- Low prediction skill

**Skill of CFS simulations of the Asian summer monsoon**
1) Simulating many major features of the Asian summer monsoon reasonably well (Yang et al. 2008; JCLI)
2) Capturing the most dominant modes of climate patterns (Liang et al. 2009; Clim. Dyn.)

**Outlines**
1. Datasets and model output
2. Simulations of climatological features and interannual variations of EAMY
4. Predictability of EAMY by the NCEP CFS
5. Summary

**I. Observations and CFS Hindcast**
- CMAP (Xie and Arkin 1996)
- NCEP/NCAR reanalysis (Kalnay et al. 1996)
- NOAA OISST analysis (Reynolds et al. 2002)
- Daily precipitation at 723 Chinese stations
- CFS hindcasts: LM1/LM2/LM3/LM4: 1/2/3/4-month lead with initial conditions of 19-23 May/Apr/Mar/Feb
- AMIP experiment

Analysis period: 1981 to 2004

**II. Simulations**

**June-July correlation of EAMY with 850-hPa wind (arrows) and 500-hPa GPH (contours). (left: observation; right: simulation)**

**Monthly rainfall climatology for CMAP (left) and CFS (right).**

**20-day mean rainfall before, during and after the China Mei-yu in 2003 for both CMAP and CFS.**

**III. Case study**

**2003 Chinese Mei-yu:** Strongest in recent 10 years; 28 people killed; Economic loss over 40 billion dollars.

**Daily precipitation (mm per day) from 1 June to 31 July 2003 (bars) in China Mei-yu region. This curve measure the climatology. The period highlighted in observation denotes the China Mei-yu period issued by the China Meteorological Administration.**

**IV. Prediction**

**Correlation of CMAP-EAMY with CFS EAMY:** (a) WPSH; (b) EASM (c) and (d) SST of different leads (see abscissa). Dashed lines represent the 95% confidence level (±4σ).

**V. Summary**
- CFS is highly skillful in simulating the climatological features of Mei-yu and related circulation patterns
- CFS reasonably simulates the interannual variations of EAMY and major influencing factors
- East Asian Mei-yu can be predicted by the CFS at LM1 with high confidence
- Ocean-Atmosphere coupling is important for Mei-yu simulation and prediction.