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**CONTROL ID:** 1808161

**TITLE:** Analysis of evapotranspiration uncertainty due to uncertain forcing data in the Northern Eurasia

**ABSTRACT BODY:** Northern Eurasian ecosystems play an important role in the global water cycle and the climate system as a whole; evapotranspiration (ET) is a critical variable to understand this role, but ET over Northern Eurasia has not yet been well studied. Using an improved version of the Terrestrial Ecosystem Model (TEM), our work examines the uncertainties in the estimation of ET caused by different climate forcing data. The focus is on the period 1979–2008. Five widely-used forcing datasets are examined, including the Climate Research Unit (CRU) TS3.1, European Centre for Medium-Range Weather Forecasts (ECMWF) Interim Re-Analysis (ERA-Interim), Global Modeling and Assimilation Office (GMAO) meteorological data, National Centers for Environmental Prediction/National Center for Atmospheric Research (NCEP/NCAR) reanalysis, and Global Meteorological Forcing Dataset for land surface modeling by Princeton University (PU). Results show that the TEM ET from these different climate forcing data ranges from 263.5–369.3 mm yr-1, and that a variety of satellite observation-based ET products (e.g. GLEAM, LandFlux-EVAL multi-dataset synthesis, MODIS ET) fall in this range of estimates. TEM ET uncertainties might be explained by the differences in magnitude and spatial patterns of climate variables like precipitation (P), air temperature (T), global radiation (R) and vapor pressure deficit (VPD). The TEM ET driven by ERA-Interim is the highest (338.4–369.3 mm yr-1) which is consistent with the highest T and VPD. CRU estimates are the lowest (263.5–290.2 mm yr-1), agreeing with the lowest T, R and P. NCEP/NCAR P and R are the highest in the majority of the spatial domain, and GMAO shows the largest T in the Eastern part of the domain. Pearson's correlation coefficients (r) between TEM ET and each climate forcing indicate that TEM ET driven by CRU and ERA-Interim are most correlated to VPD, while those driven by NCEP/NCAR and PU are most correlated to T, and TEM ET driven by GMAO is most correlated to VPD in the North and to T in the South. T is the most important factor for all the five ET estimates in growing season, while the dynamics of ET respond to changes in R and VPD throughout the rest of the year. This study shows that the uncertain forcing data results in a large difference between the lowest and highest ET estimates (102.8 mm yr-1), suggesting that the quality forcing data is critical to accurately quantify regional ET in Northern Eurasia.

**CURRENT SECTION/FOCUS GROUP:** Global Environmental Change (GC)

**CURRENT SESSION:** GC049. Environmental, Socio-Economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System

**INDEX TERMS:** 1818 HYDROLOGY Evapotranspiration, 0414 BIOGEOSCIENCES Biogeochemical cycles, processes, and modeling , 1631 GLOBAL CHANGE Land/atmosphere interactions, 1615 GLOBAL CHANGE Biogeochemical cycles, processes, and modeling .

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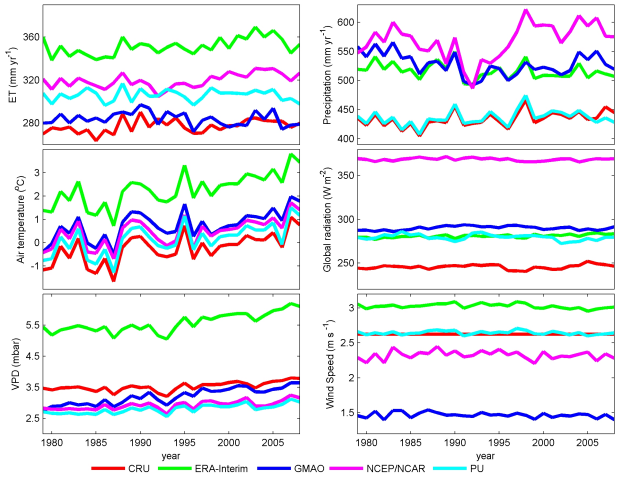
**TITLE OF TEAM:**




Variations of TEM ET and climate forcings during 1979-2008 in the Northern Eurasia region from five different forcing data

(No Table Selected)

**PRESENTATION TYPE:** Assigned by Committee (Oral or Poster)

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