

# Surface air temperature datasets (UAHNMATv1 & UAHTMAXv1)

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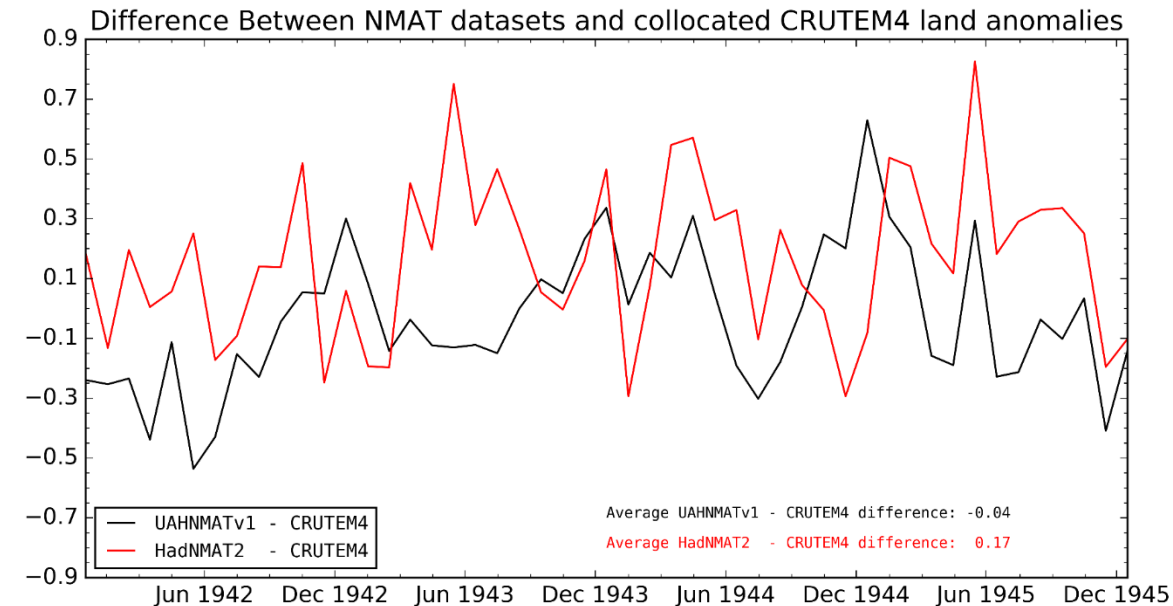
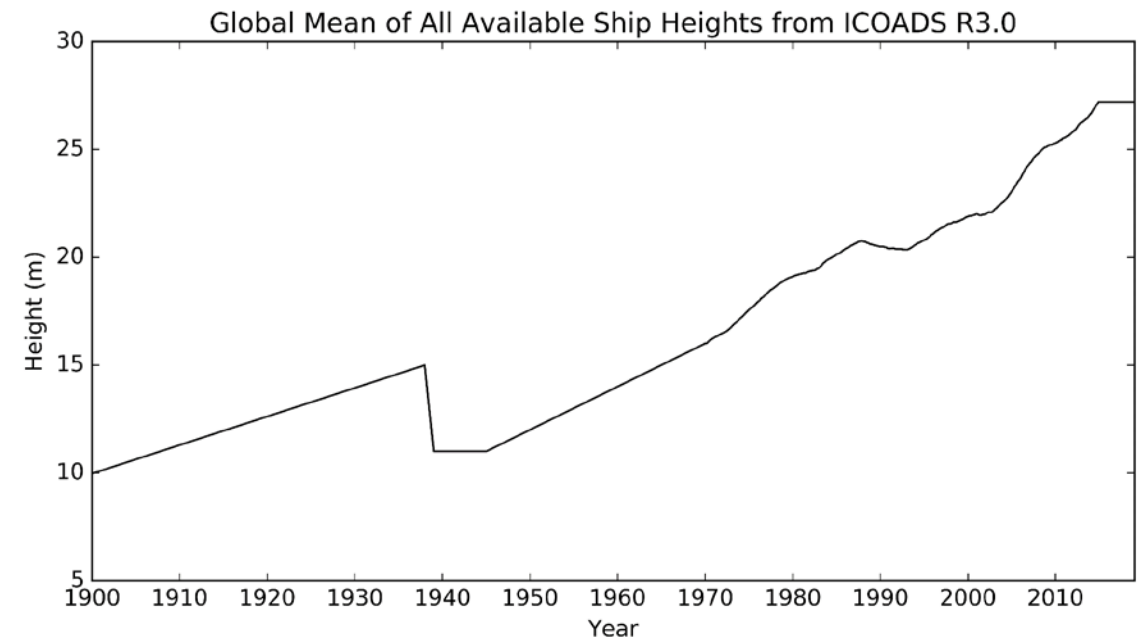
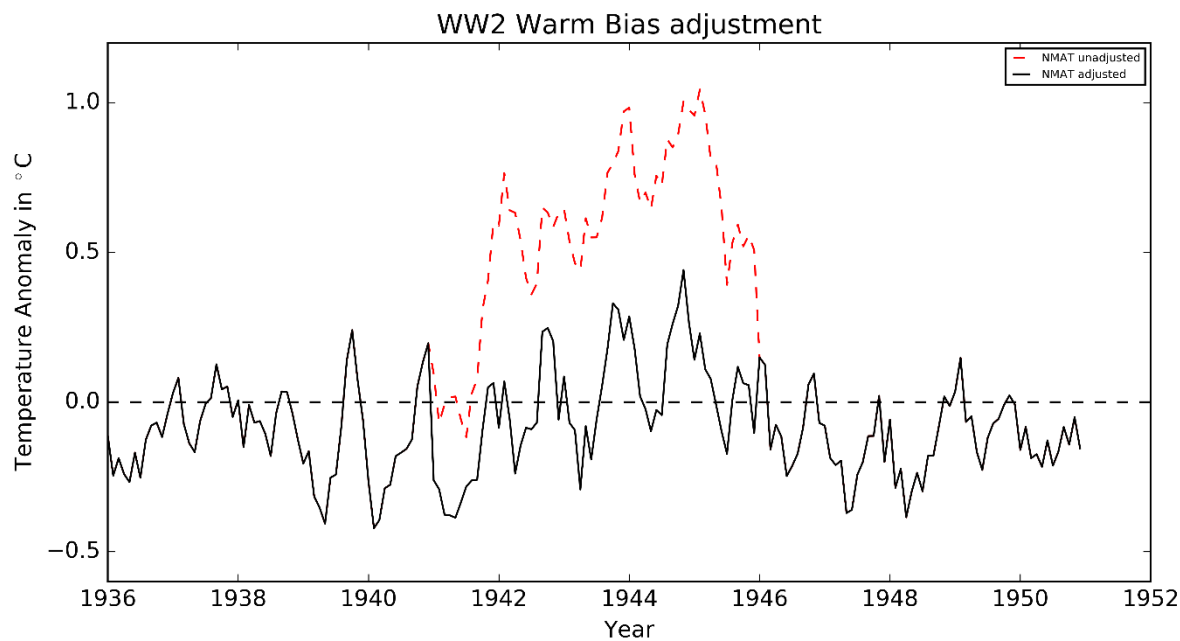
# Motivation

- ▶ Traditionally, SSTs are used as a metric to assess the state of the surface climate over the oceans.
- ▶ However, marine air temperature (MAT) serves as a physical-consistent geographical complement to near-surface temperature over land.
- ▶ It has been strongly recommended that various groups generate climate records independently (NRC, 2001).
  - ▶ At the time of UAHNMATv1 development, only one complete NMAT dataset existed, HadNMAT2.
- ▶ Goal:
  - ▶ 1) Development of a night-time MAT (NMAT) dataset. (Junod and Christy, 2019 *Int J Climatol.*)
  - ▶ 2) Development of a maximum temperatures (TMAX) over land dataset.



# Methodology

- ▶ Homogenize in situ observations from ICOADS R3.0 dataset.
  - ▶ Air temperature height adjustment to 10 meters using varying lapse rate method.
  - ▶ World War 2 warm bias correction
- ▶ Gridded to 5.0° monthly anomalies (1900-2018).



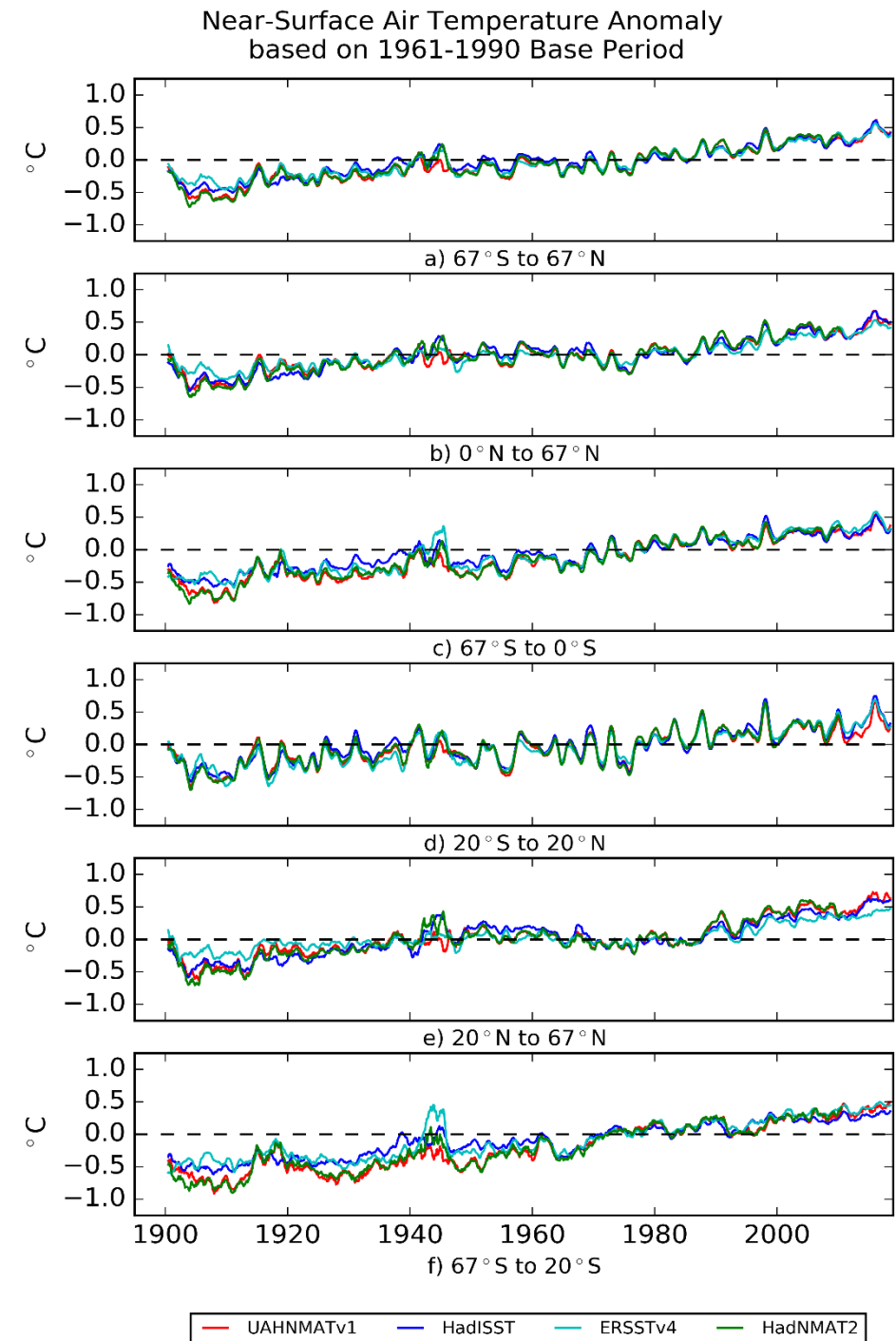
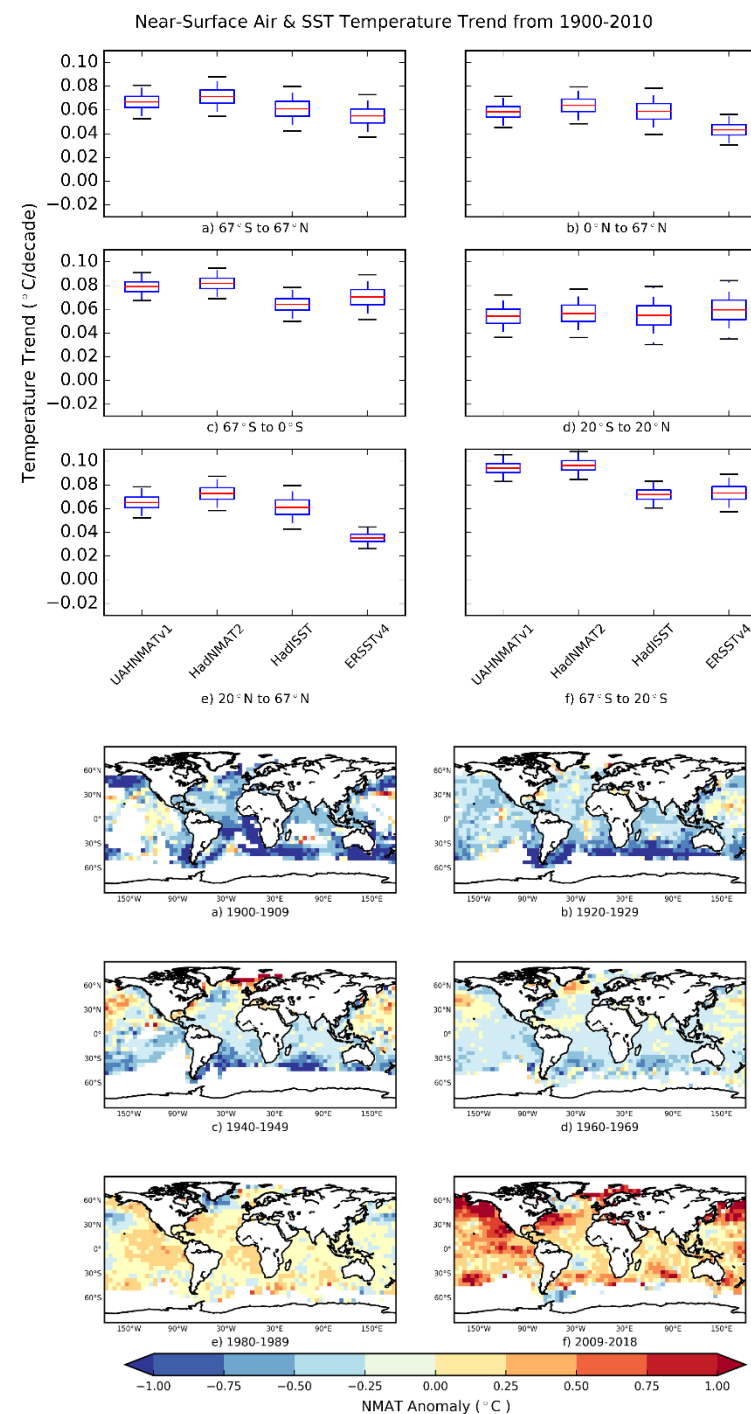
# Results

▶ UAHNMATv1 dataset is virtually identical to the HadNMAT2 global trend (1900-2010)

▶ Difference of only  $0.004^{\circ}\text{C}/\text{decade}$

▶ Regional trend difference larger but firmly within 95% CI.

▶ More recently (1979-2010), trend difference larger but still broadly agrees.



# Future Work

## ▶ Short term:

### ▶ Development of UAHTMAXv1 (ongoing)

- ▶ Maximum temperatures over land more relevant variable to long-term climate response than mean or minimum temperature (Christy et al., 2009)
- ▶ Utilize data from International Surface Temperature Initiative (ISTI) (Rennie et al., 2014)

## ▶ Long term:

### ▶ Development of a composite UAHNMATv1 & UAHTMAXv1 dataset (UAHTEMPv1).

- ▶ Explore how both components of this surface air temperature dataset will inform the larger project (“Toward an improved estimate of climate sensitivity and its application to key climate metrics”).
- ▶ Provide a better variable for determining the surface-based climate sensitivity given the dataset homogeneity.

