

1 **Supplementary Materials for “Simulating out-of-sample**
2 **atmospheric transport to enable flux inversions”**

3 **1 Complete training data (in-sample FootNet)**

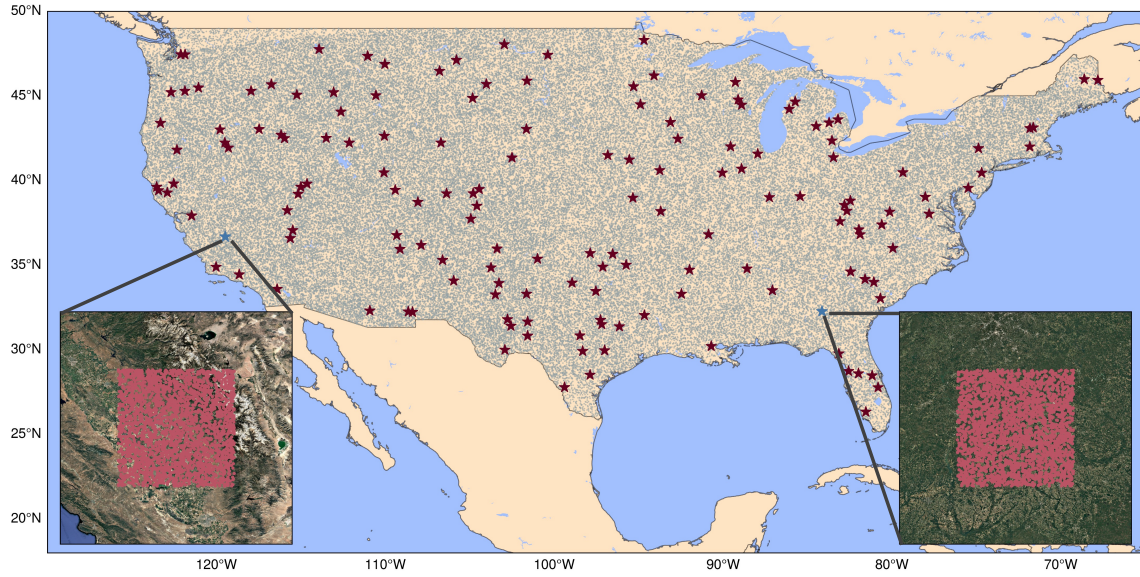


Figure S1: Receptor locations sampled for the in-sample FootNet model training. The grey dots represent pseudo-observations randomly sampled across the entire CONUS to ensure generalizability. The red stars represent randomly sampled 400 km×400 km regions in which further 2500 pseudo-observations were sampled. Background satellite imagery is taken from © Google Maps.

4 **2 Feature importance**

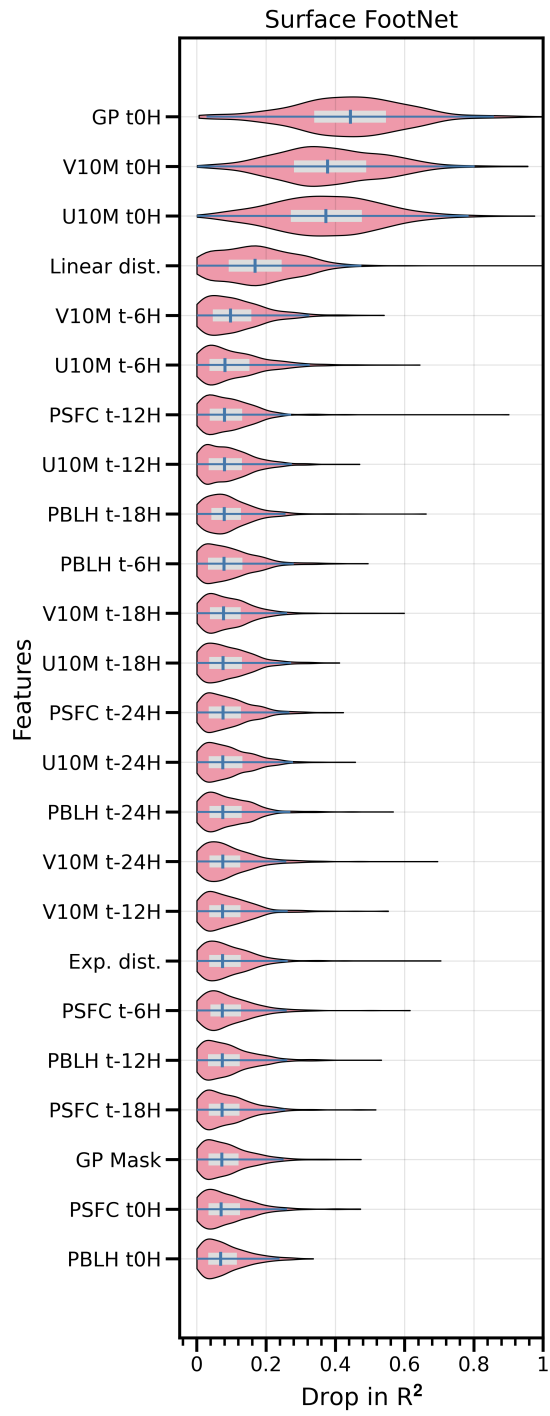


Figure S2: The complete feature importance analysis for Surface FootNet model.

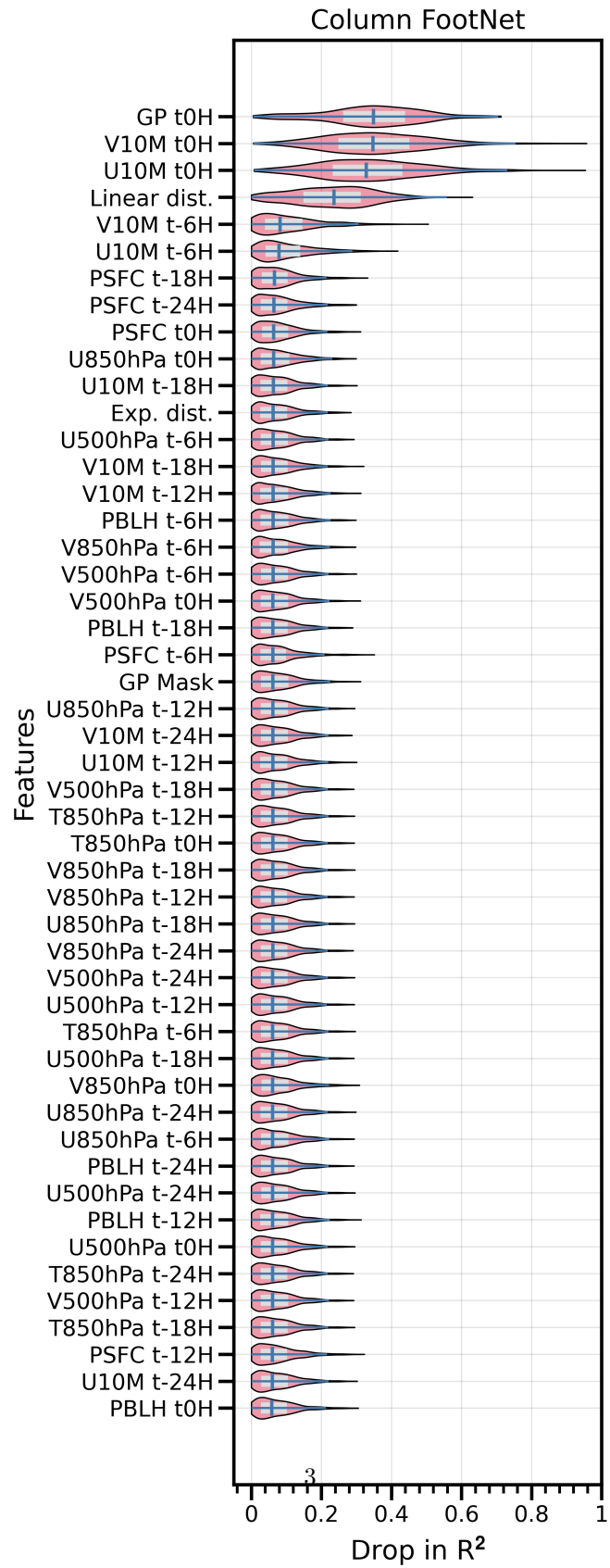


Figure S3: The complete feature importance analysis for Column FootNet model.