

Issue 8 - Impact of observations scattered across space and time

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Most meteorological observations are performed at regular times of day (e.g., 00Z and 12Z) in specific locations. In situ SST obs are major exception to this rule, but SST changes slowly compared to the atmosphere. Most satellite observations are for wide areas of the globe. GPS-RO is nearly unique because it observes point measurements that change in location and time of observation in a not quite random way. As a result, utilizing them for climate change analyses presents new challenges. Past analyses have averaged the observations into large grid boxes and then into large time segments (e.g., 10x10 degree boxes averaged over a month). An analysis of the errors this technique causes would be helpful in putting the use of GPS-RO for climate into perspective. Perhaps the potential impacts of the errors could be quantified by subsampling a very high resolution model output at the GPS-RO observation locations in time and space (by latitude band and over land and ocean and elevation) and comparing the results to the full model field results.

Response from Kevin Trenberth:

GPSRO is not actually a point measurement but samples a finite size footprint and this actually makes it more useful to climate and less useful for mesoscale meteorology. Many errors are likely to be random and thus average out, although this needs to be quantified. The exercise suggested may be useful

Also to the statement: Most meteorological observations are performed at regular times of day (e.g., 00Z and 12Z) in specific locations. Response: Not true: all satellite soundings are asynoptic.

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