Notes on data discussion session (A-L section), Tuesday morning, August 20, 2013.

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What issues arise in data quality or quantity?

Pre-1979 and post-1979 data are different in terms of quality, because of the use of satellite data assimilation since 1979.

Are there other roles of data assimilation in the climate records?

The reanalyses are credible for examining large-scale features, but precipitation from reanalysis is a problem (since it is primarily a model-based metric)
temperatures, with the exception of the surface should be fine in reanalysis.

It is not obvious how well the reanalyses replicate more complicated diagnostics (e. g., soundings) on the larger scales.

North American regional reanalysis (~32 km horizontal resolution) has been useful (also very good for 24-h precipitation in the continental US)

ERA-interim reanalysis (or NCEP's CFSR) for global analyses as NARR doesn't go very far south for understanding transport

Overlaps in observation methodologies (for a time period) when change methodologies;
This overlap happens in Europe
but not in North America

Quality control (QC):
Is a 10% (or 20%) missing criteria adequate as a threshold for accepting a station as being used in the climate records?

Spatial dependence structure - homogeneous or not - Nearby stations for validation - looking for any info to say that a value is not a bad data point
QC also makes use of other observations at previous or next time point.

Adjust for climatology by looking at percentiles of observations at each

station to norm relative to site-specific climatology

How well do station observations compare with reanalyses?

Generally, it is a valuable exercise to compare reanalysis and observations to provide feedback to improve modeling

What is role of reanalyses?

Difficulty in going back in time earlier than 1948, with reanalyses driven only by surface pressure data earlier;
historical reanalysis about as good as 2-3 day forecast for large scale patterns, probably good going back to early 20th century

difficulty to match observational extremes and extremes in reanalysis - there is mismatch in which days and magnitude

Surface temperature data not assimilated into the reanalyses so temp fields are coming from forecast and may not be very accurate
(notetaker: This is also the case for precipitation fields in reanalysis)

What observation-based or model data are needed for extreme event identification?

Choice of reanalysis may be dictated by time period of

availability

Use of surface datasets for temp/precip extremes and reanalysis for LSMPs

Models and observations might have point (small scale events) that a reanalysis will never capture. Therefore, is there a proxy for these extremes in the reanalyses?

Are there better means of quantifying precipitation, using more novel technologies?

possibility of using quantitative estimates from radar data on precipitation?

GPM (rain rates)
Satellite
Radar?

Aerosols

The issue of aerosols was raised….the question of whether the remote sensing measurements of aerosols was raised….satellite?

Dust impacts significantly the dynamics of tropical cyclones.

Air masses

Fronts, …though appearing the same, are there differences in the environmental air masses during the past several decades??

What ETCCDI indices are relevant?

how sort into frontal vs. ETCs - how separate into different dynamical schemes
what criteria to distinguish these?
self-learning tools to find fronts

Most events discussed by Ken Kunkel were part of large-scale events; even if southeast, little from convection events
conclusion: looking at large-scale patterns does address most of the events

Is moist convection always identified with large-scale atmospheric structures documented by the reanalyses?

are air mass characteristics changing? is number of fronts changing? what is influence of tropics? The oceans?

what statistical techniques should be used with ETCCDI indices?
there has been criticism of some of the ETCCDI indices

question: how much trust modelers when they come up with some proxies/diagnostics that may be related to extremes?

Possible recommendations in light of this discussion:

1. **Historical reanalyses prior to 1948 show promise in documenting extremes. Examine means to incorporate older station data that have otherwise been rejected.**
2. **Explore newer means of documenting precipitation (radar, satellite, especially GPM)**
3. **Examine means of documenting aerosol concentrations.**

4. **Examine air mass changes in the historical records**
5. **Ocean basin data, including the Arctic, needs to be incorporated into climate-change data records**