World Meteorological Organization

Weather • Climate • Water

An introduction to climate monitoring

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Why do we need climate monitoring?

An almost infinite range of applications; some examples:

- Assessment of observed climate change
- Using seasonal rainfall deficits to give early warning of potential crop failures, water shortages or high fire risk
- Using information on extreme daily rainfalls to inform flood warnings downstream

Information demands (e.g. timeliness) vary greatly depending on applications

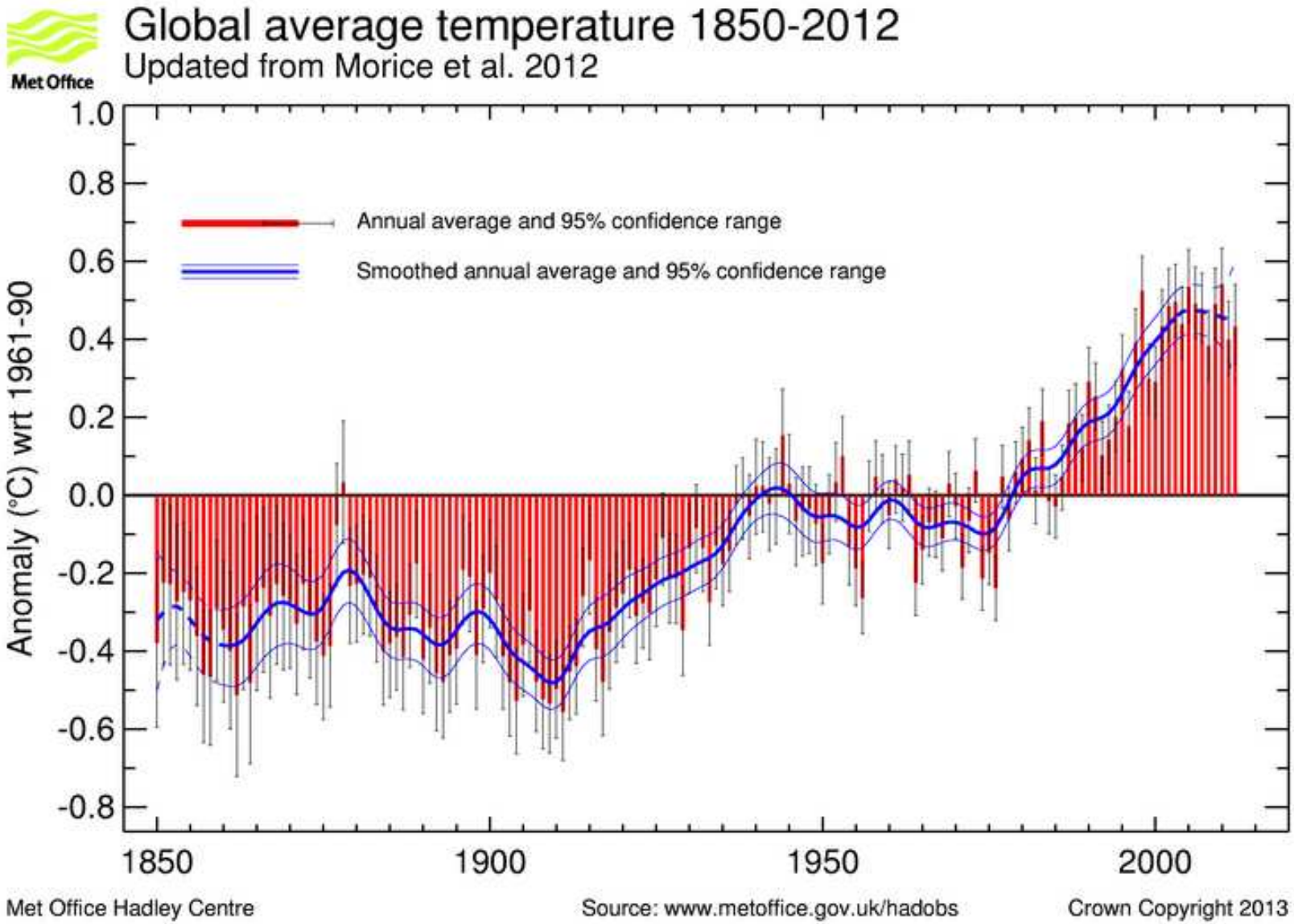
Climate monitoring – covering a very wide range of timescales and variables

- Long-term climate change over periods of decades to centuries
- Seasonal to interannual climate variability
- Events on short (e.g. daily) timescales (especially extreme events)

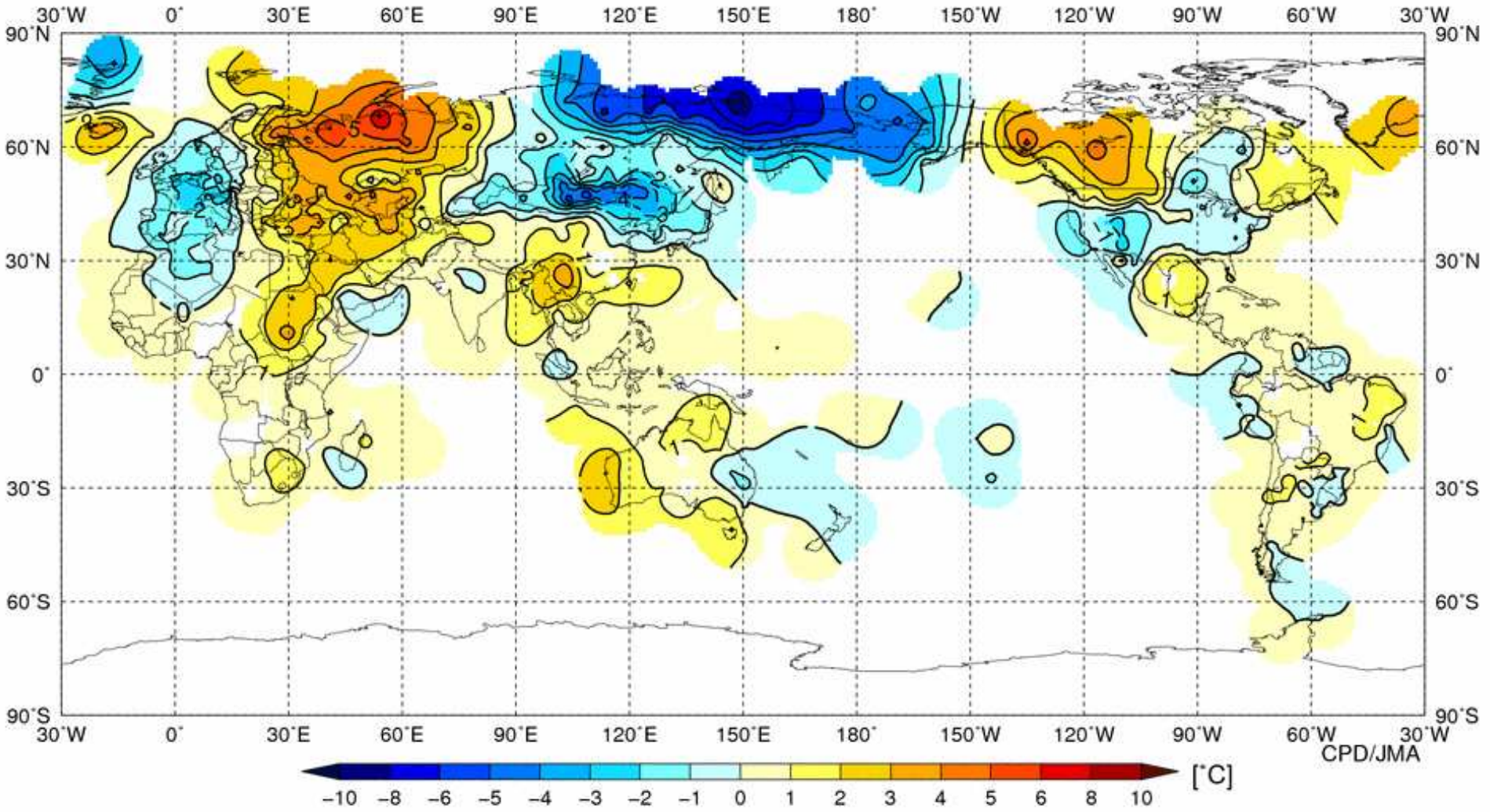
Many variables of potential interest – temperature and precipitation the best-monitored at present

No clear distinction between ‘climate’ and ‘weather’ timescales

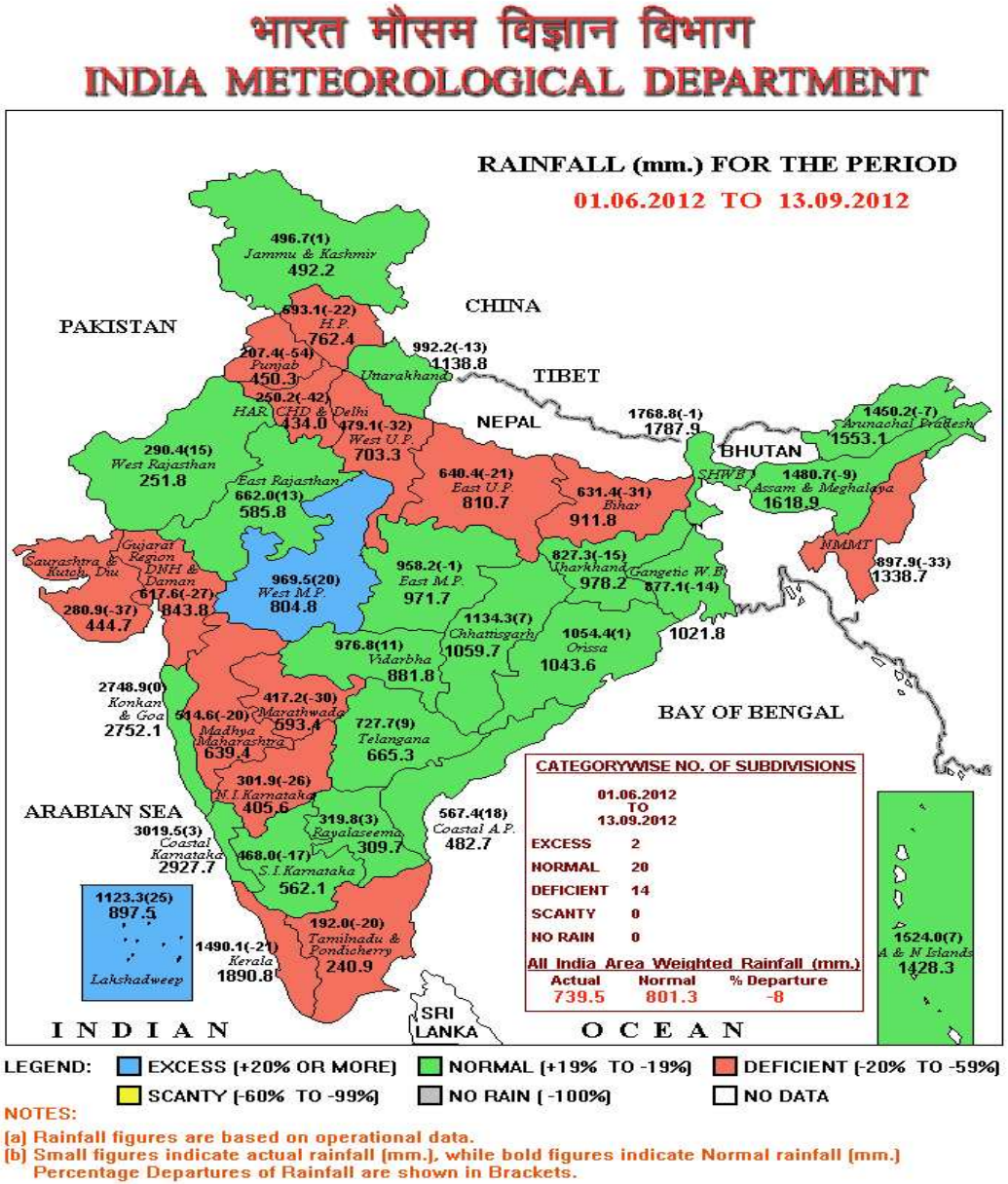
To what extent do we try to summarise things in a single number?



Global temperature anomalies – February 2013

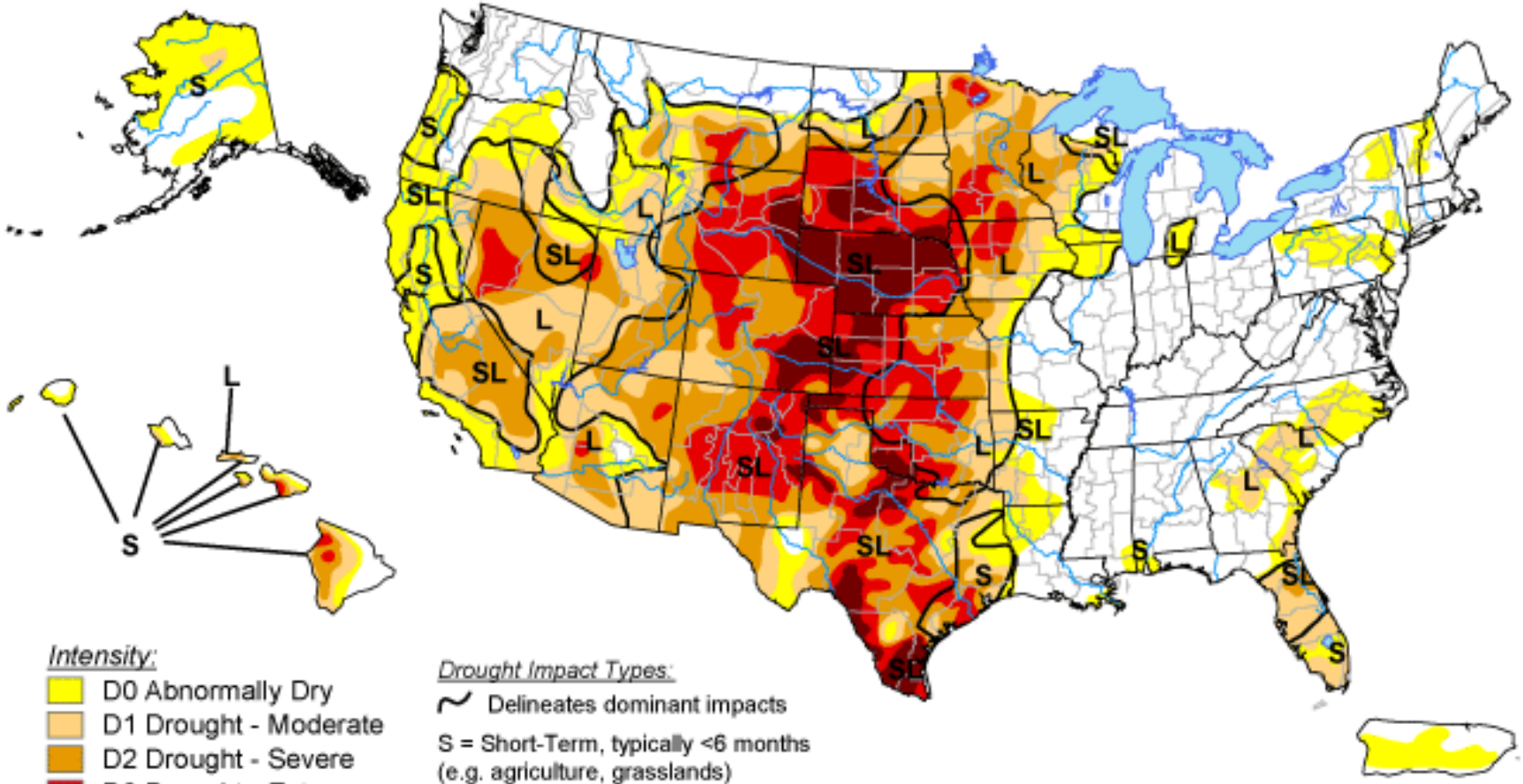


Indian monsoon season rainfall (2012)



U.S. Drought Monitor

April 2, 2013
Valid 7 a.m. EDT



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically <6 months (e.g. agriculture, grasslands)

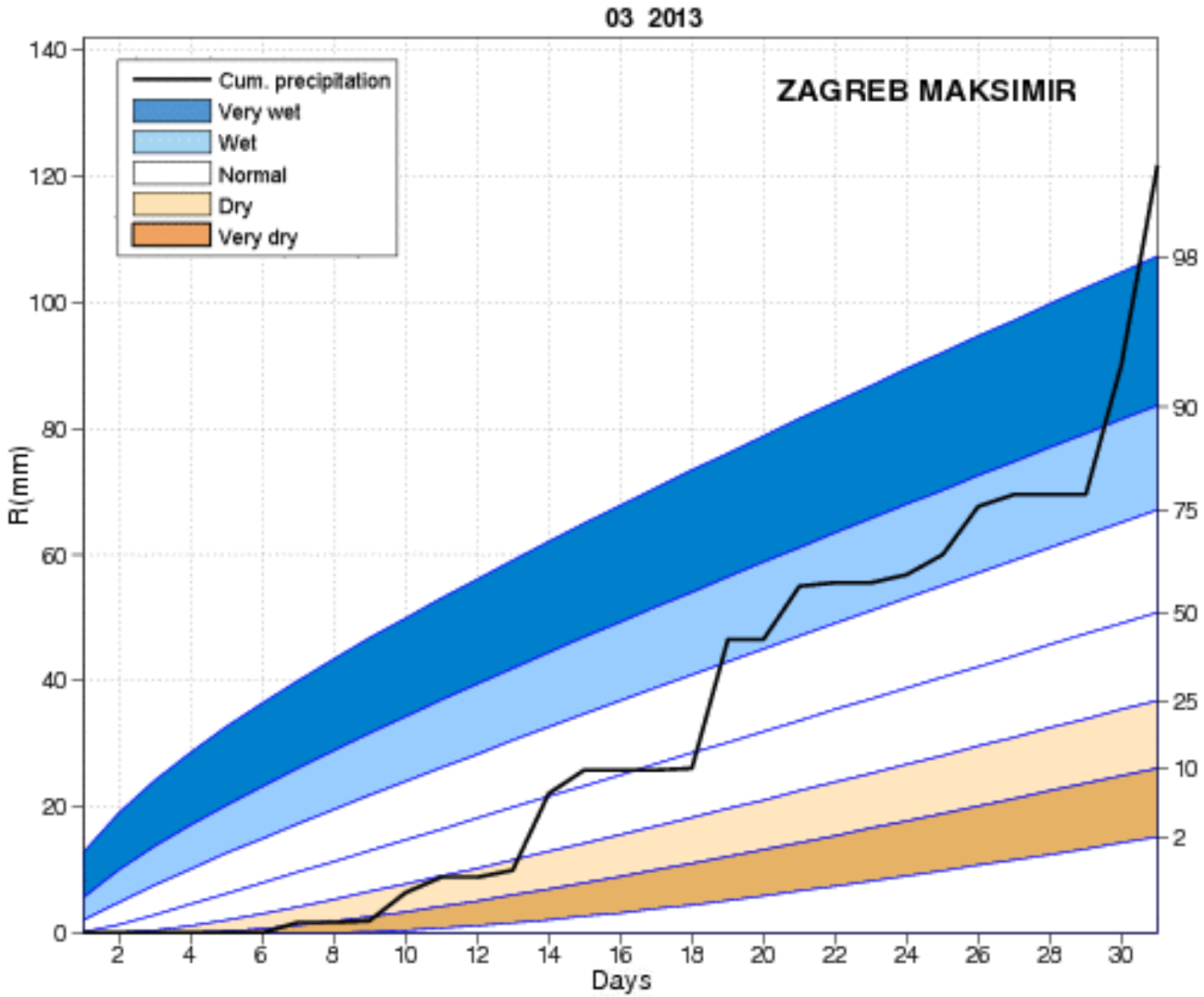
L = Long-Term, typically >6 months (e.g. hydrology, ecology)

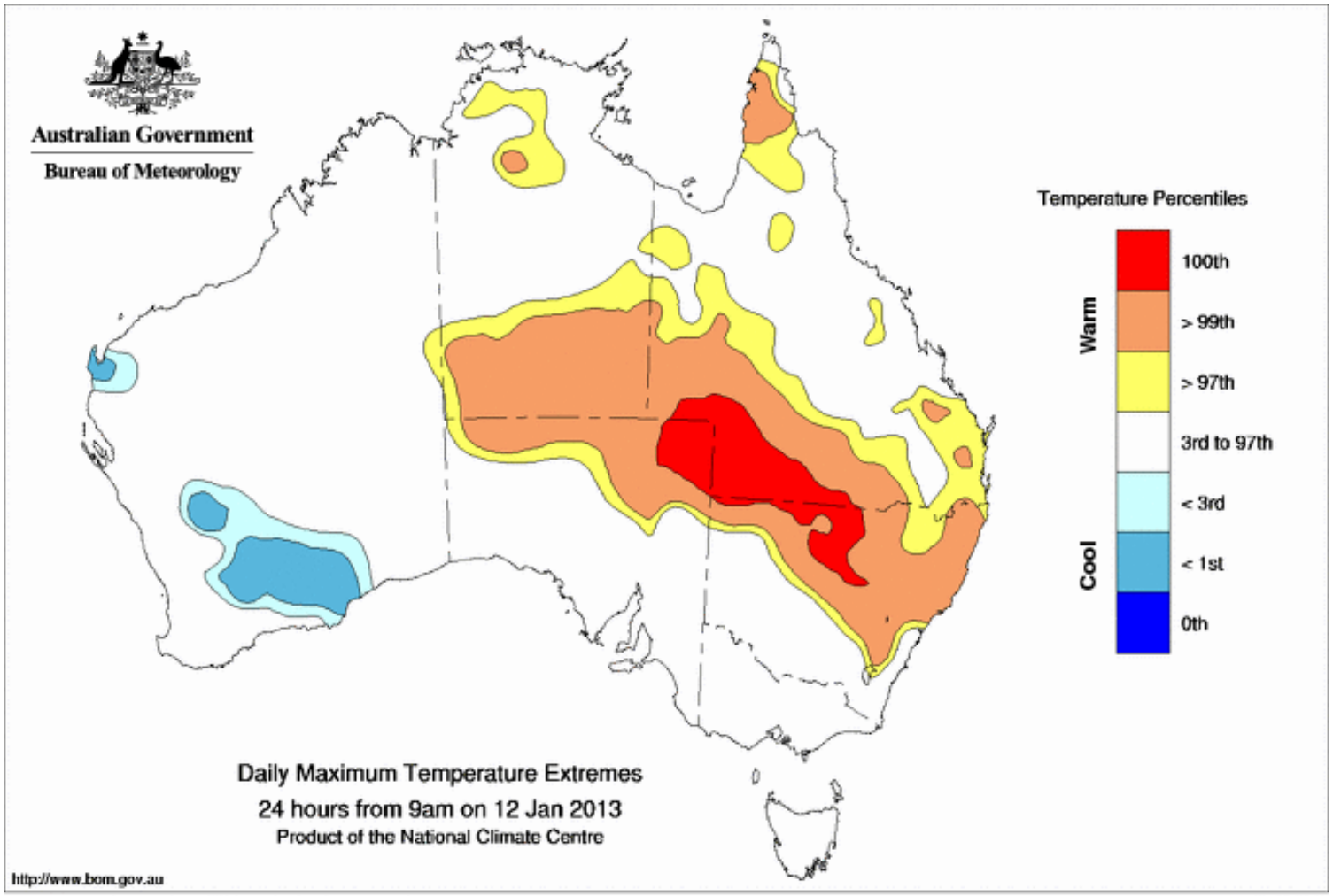
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu/

Released Thursday, April 4, 2013

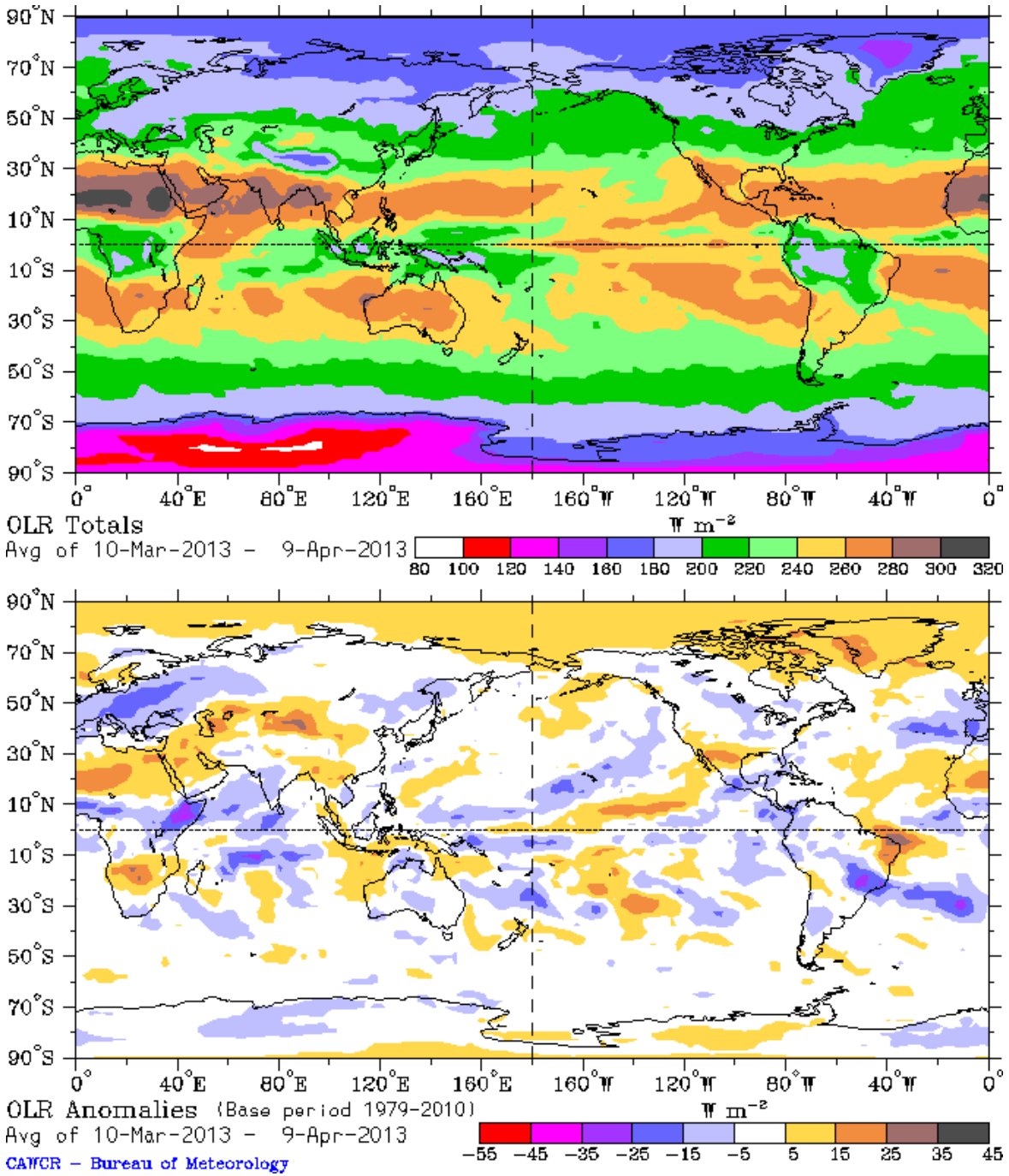
Author: Rich Tinker, NOAA/NWS/NCEP/CPC


03 2013
ZAGREB MAKSIMIR
Cum. precipitation
Very wet
Wet
Normal
Dry
Very dry
R(mm)
Days
0
20
40
60
80
100
120
140
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
98
90
75
50
25
10
2

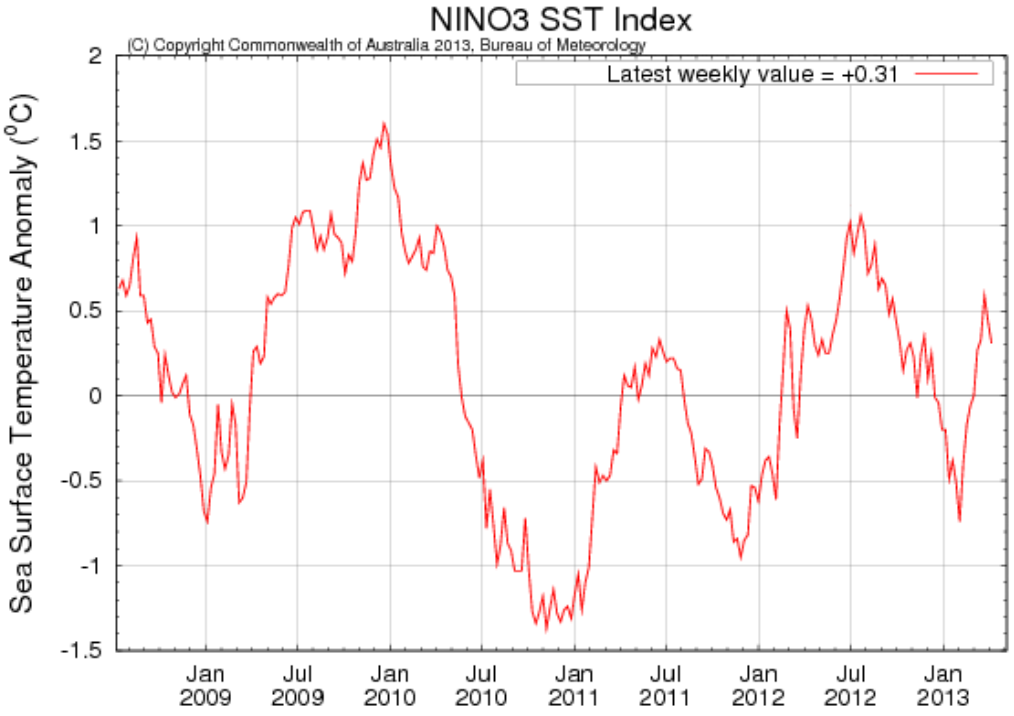


Issued: 22/02/2013

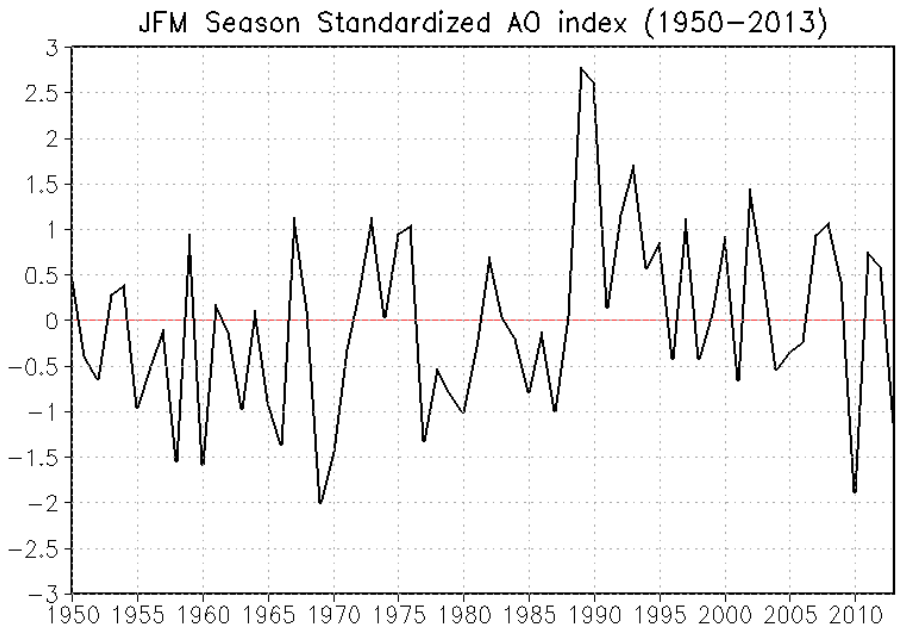
More than the ‘traditional’ variables are of interest



Indicators of key drivers of the climate system also of great interest



El Niño-Southern Oscillation

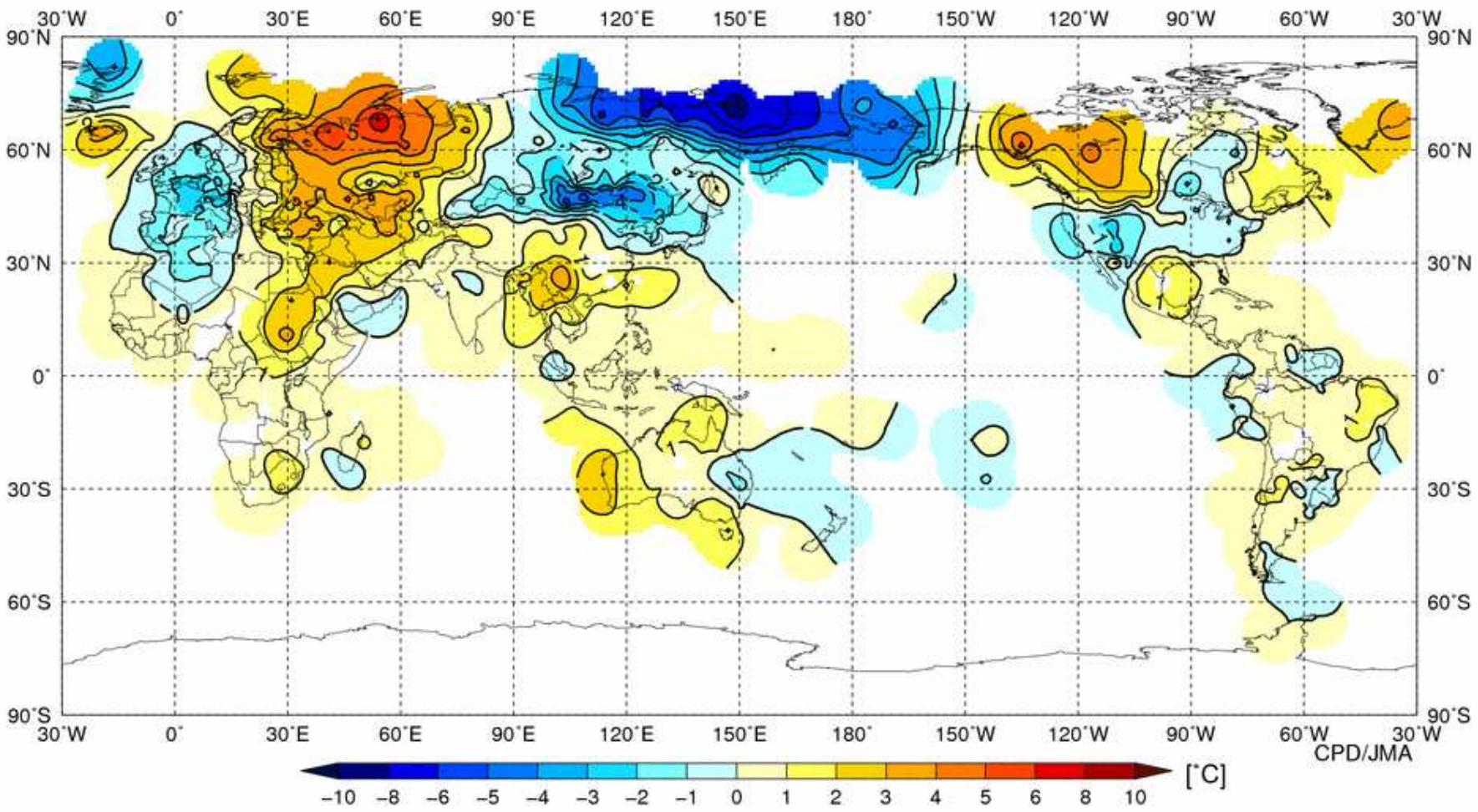


Arctic Oscillation

Some issues for climate monitoring

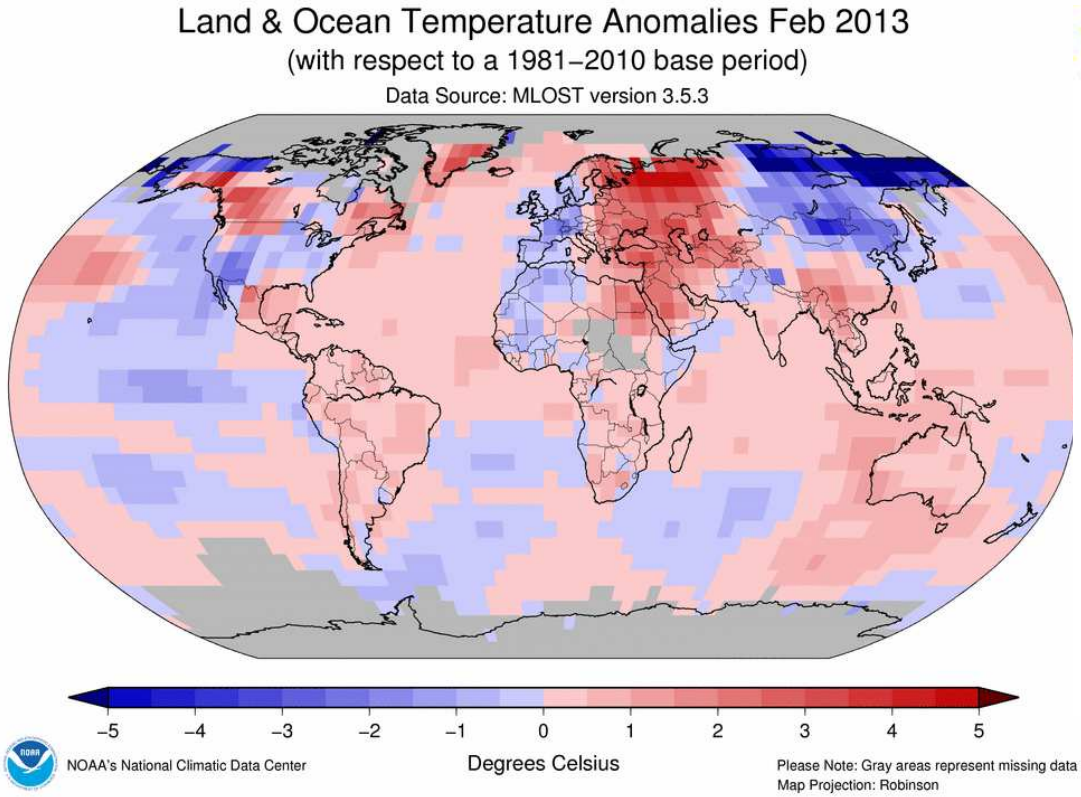
- Availability and quality of underlying data
- Timeliness of data (important for some applications, but not others)
- Long-term consistency of data
- Generating large-scale analyses from various forms of source data
- Capacity to operate analysis systems
- How to visualise data with wide range of climatological values

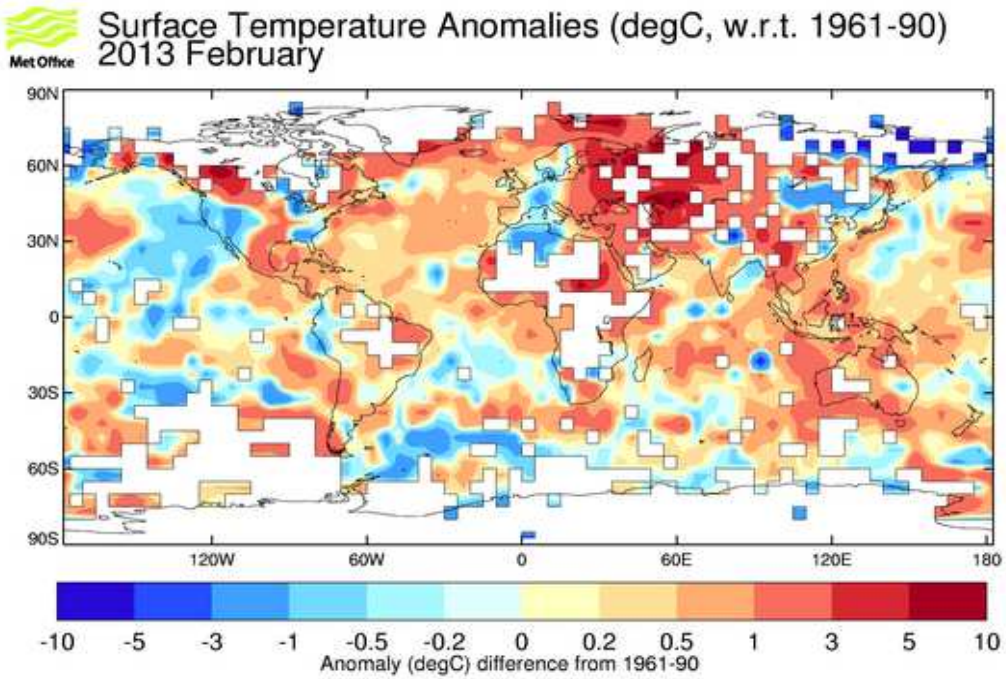
What do we need to generate a product like this?



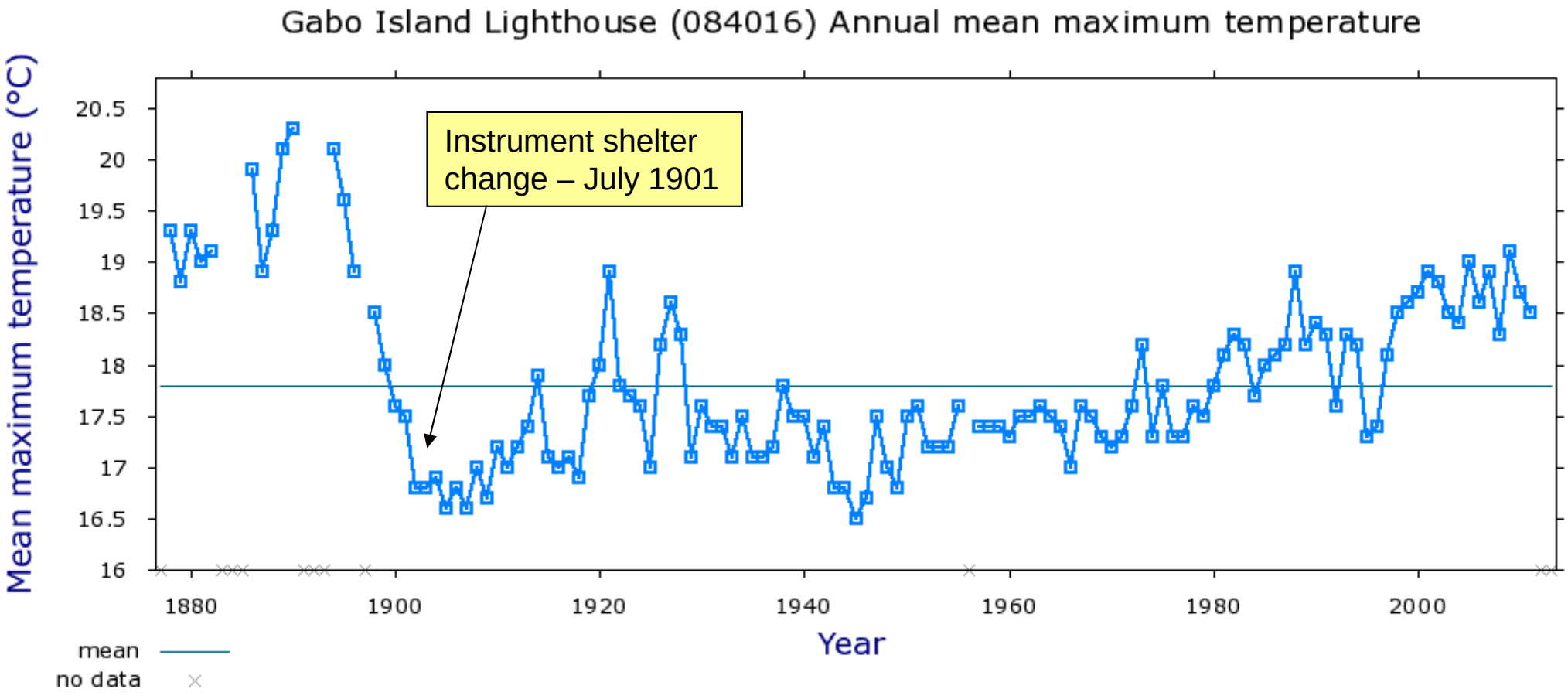
- Calculate station monthly mean from daily data
- Calculate long-term normal for station
- Calculate difference between monthly mean and normal

The difference that a different base period can make



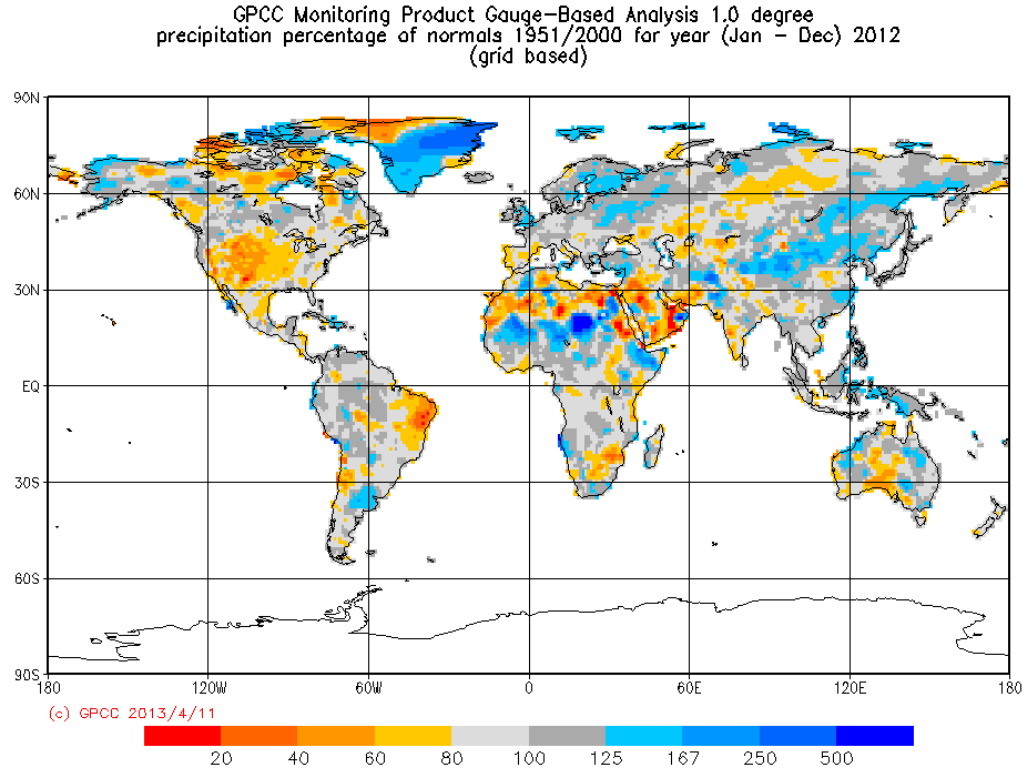


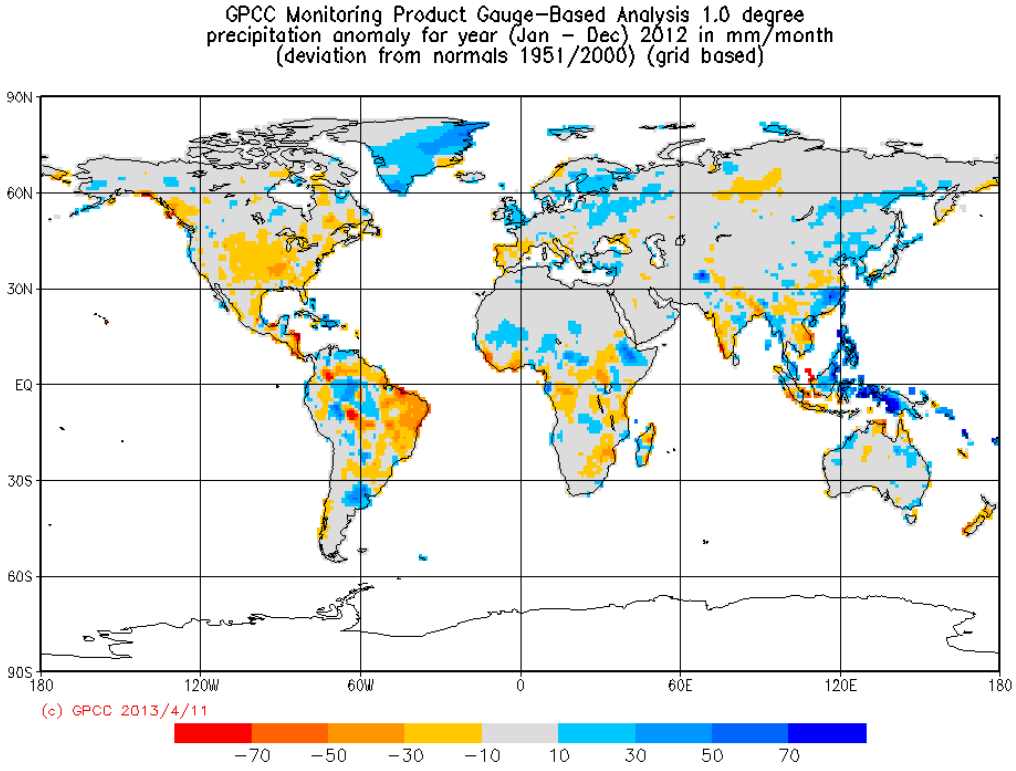
Why long-term consistency is important



Note: Data may not have completed quality control
Observations made before 1910 may have used non-standard equipment

Different forms of visualisation – 2012 global precipitation



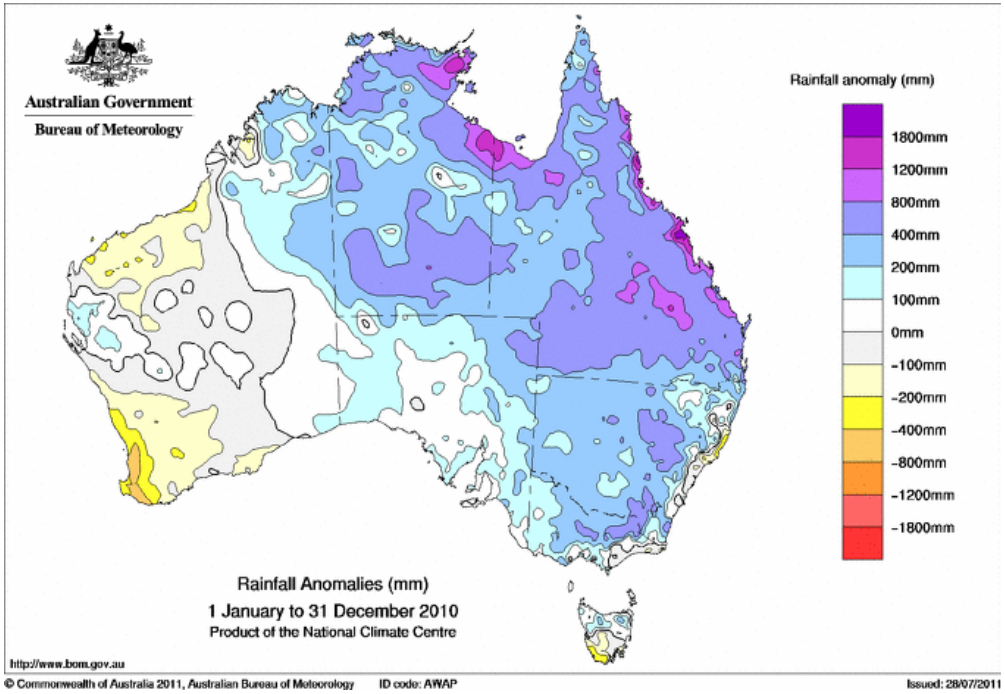


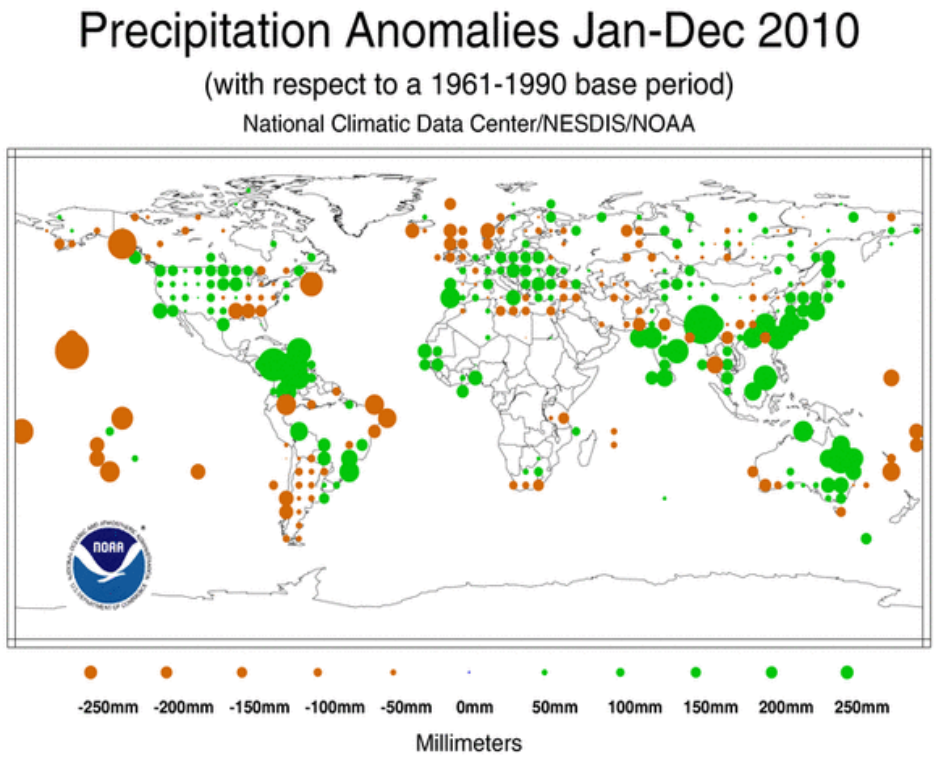
Some different types of data sets

- Global/regional data sets (often sourced from GTS data, e.g. CLIMAT, SYNOP)
- National data sets drawn from national databases
- Data sets based on wholly or partly on remote sensing

These data sets do not always give consistent results!

Scale resolution driving a difference between national and global products





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Thank you for your attention