WMO AND WBAN RAOB AND PIBAL STATIONS REPORTING FOR July, 1955

# STATIONS PLOTTED: 966

0 = raoB
* = pibal

# WMO: 590
wmo raoBs: 355
wmo pibalS: 363

# WBAN: 376
wban raoBs: 186
wban pibalS: 364

Jul 1955
Some Methods to Send Data

1. 

<table>
<thead>
<tr>
<th>Date</th>
<th>Tech</th>
<th>Capacity</th>
<th>Tapes/ TB</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/1995</td>
<td>DLT4000</td>
<td>20 GB</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>DLT8000</td>
<td>40 GB</td>
<td>25</td>
<td>Drive $2300 (04/02)</td>
</tr>
<tr>
<td>~2002</td>
<td>~100</td>
<td></td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

2. 

<table>
<thead>
<tr>
<th>Discs</th>
<th>CD-ROM</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987 – 2002</td>
<td>CD-ROM</td>
<td>0.66 GB each</td>
</tr>
<tr>
<td>2002</td>
<td>DVD</td>
<td>4.7 GB</td>
</tr>
<tr>
<td>Soon</td>
<td></td>
<td>9.4 GB or more</td>
</tr>
</tbody>
</table>

3. Internet

NOTE: Some tapes now hold 200 GB
- So 5 tapes hold 1 TB
- NCAR now has 1 TB of mesoscale data
- Pressure stack global reanalysis, 54 years is 1.37 TB
- In 1960 to 70, 1 TB of data needed 100,000 tapes

These methods help do bulk transfer of data.

Roy Jenne
May 2002
Examples of Bundles of Papers

1. Data lists for several countries
   - Canada, England, Japan, Australia, Africa
   - WMO lists

2. Observations for reanalysis
   - Raobs and pibals ~ 1240 pages
   - Surface land observations ~ 300 pages
   - Satellite data ~ 900 pages
   - Early observations in USA, etc. ~ 300 pages

3. Technology, computing ~ 1700 pages
   - Technology: Good use, hype, bubble 59 pages

4. Selected science topics ~ 810 pages
   - Past climate of earth: Ice ages and more 71 pages

5. Other types of data ~ 660 pages
   - Guide to world social and economic data 137 pages

How to find the RJ bundles of papers:
http://dss.ucar.edu/docs/papers-scanned/papers.html

Roy Jenne
9 May 2002
US Grids of Precip from NCEP

Hourly and Daily

- Grids from gage precip
  - Hourly grids 01/1995 – 03/2002
  - Daily grids 01/1996 – 03/2002

- Grids of only radar data

- Grids of radar plus gages

- Grids from river forecast center

Roy Jenne
10 May 2002
24 Hour Radar Precipitation, April 30, 2000; mm
A few slides

about more

Water Data

will follow

- Precip data
- Precip grids
- River discharge

Roy Jenne
May 2002
Precipitation Data for North America

1. Hourly precip data (USA)
   - 2500 stations (1948-1996) — NCDC
   - Hourly US Precip grids by CPC (1948-99)
   - NCEP:
     a. Hourly real time precip, stn archives, started Jan 1996
     b. Hourly US precip grid, stations only, start Jan 1996
     c. Hourly US precip, radar only, started Jan 1996
     d. Hourly US precip, radar plus stations, start Apr 1996

2. Daily precip data (USA)
   - 7500 co-op stations (1895-on) — NCDC
   - NCEP
     a. Daily precip obs (real time) started Apr 1995
     b. Daily US grids started Apr 1995 (based on NCEP inputs)

3. Daily precip Canada
   - Guess about 2500 stations
   - Data in US for early years through 1991

4. Daily precip for Mexico
   - A tape of data is in the USA

Roy Jenne
Dec 1997
Revised May 2002
Daily Grids of Precipitation over North America

Data Sources (Daily Observations)

<table>
<thead>
<tr>
<th>Region</th>
<th>Period</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>1948 – 1996; daily, from HPD (~2900)</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>1948 – 1990 (~300 stations)</td>
<td></td>
</tr>
<tr>
<td>Central America</td>
<td>1979 – 1993 (22)</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>1963 – 1996 (490)</td>
<td></td>
</tr>
</tbody>
</table>

Analysis for Each Region

1°x1° – grid
Cressman Scheme

Merge Grids for all North America

1948 – 1990

Note:
Not including Canada during 1948 – 1962
Not including Central America during 1948 – 1978

Who makes the grids?
– Prepared by CPC in NCEP

Roy Jenne
Oct 1999
A Global Set of Monthly River Flow
– Subset of Rivers –

<table>
<thead>
<tr>
<th>Regions</th>
<th>Rivers</th>
<th>Have?</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>350</td>
<td>Yes ?</td>
<td>2600 stns on CD</td>
</tr>
<tr>
<td>USA</td>
<td>450</td>
<td>Yes</td>
<td>Of 8000 stns</td>
</tr>
<tr>
<td>Mexico</td>
<td>40</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>20</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Venezuela</td>
<td>40</td>
<td>Maybe get</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>150</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>30</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>Min 40</td>
<td>A few</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>200 ?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>39</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>- more</td>
<td>100 ?</td>
<td>Not yet</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>50</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>f USSR</td>
<td>270</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cent Europe</td>
<td>75</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>West Europe</td>
<td>100</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Could WMO say . . .
- We need some open data
- And encourage more open data
- Data updated each 1 to 3 years

Roy Jenne
1999
River Data for Latin America

Henry Diaz has been working with Mike Dessinger (Scripps, 619/822-1507) to prepare data.

1. Mexico
   - Data for about 40 rivers, 10 – 40 years long.
   - The US got data on a CD and another source.
   - Monthly data, maybe also some daily.

2. Rivers in Columbia
   - Had visitor from Columbia in July 1999.
   - Has data from 15 – 20 sites.
   - Record length about 10 – 40 years.

3. Venezuela
   - There is data for the big Orinoco River.
   - Henry visited there last year; he will send me an email contact.

Roy Jenne
Other Sources of Water Data

- Ocean precip from microwave data

- Tropical precip from TRMM
  - Launch Oct 1995

- Precip from 3-hour geosynchronous satellite data
  - Use IR threshold (GPCP data)

- Data from Grace satellite pair
  - Launch March 2002
  - Measure gravity with high precision
  - Information for snow amount, soil water, deep ocean currents, etc.
  - Launch March 2002
  - See document RJ0147 at NCAR

Roy Jenne
9 May 2002
World Monthly Precipitation Grids
   See Eischeid, et al.
   (Journal of Applied Meteorology, Dec 1995: Vol. 34, No. 12)

1. The 5° monthly grids available since -1990
   ‣ From land areas, for the years 1851-1995
   ‣ And 1880-on is quite good

2. Based on the monthly station data (the “DOE” set)
   ‣ 7500 precip stations
   ‣ 6000 temperature stations
   ‣ Now use updates from NCDC

3. These observations and grids were used in IPCC 1995.

4. 2.5° grids have been available since February 1998
   ‣ These are anomaly grids
   ‣ One is a land-only precip grid
   ‣ One includes MSU satellite precip anomaly over the oceans (1979-on). They blend quite easily.
   ‣ Two forms: less smoothing or more smoothing
   ‣ NCAR will have precip and temp grids valid -2001.

5. Compare grids over land with Arkin grids
   ‣ The numbers are about the same
   ‣ The Arkin (NOAA-CPC) grids are smoother

Roy Jenne
May 2002