

The WMO AOPC/OOPC Surface Pressure Group

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**Second JCOMM Workshop on Advances in Marine
Climatology (CLIMAR-II),**

Brussels, Belgium, November 17-22nd 2003

OUTLINE

Role

Terms of Reference

Core Membership

**Overview of the Surface Pressure Group
Workshop, Norwich 20th –21st November,
2002**

Current activities & Issues

Role

Set up in early to mid 2001, the role of the WMO AOPC/OOPC Surface Pressure Working Group is to promote the development of long-term high-quality analyses of atmospheric surface pressure. The Group was set up to operate through email, so that direct meetings would generally not be necessary. In operation, we have found that it is still desirable for Group members to meet together.

Terms of Reference

- to promote the analysis of global surface pressure from both real-time and historical sources using both daily and monthly data
- to record and evaluate differences among surface pressure analyses through comparison of basic products
- to recommend actions needed to ensure the quality and consistency of surface pressure analyses based on analysis of those differences

Terms of Reference

- to promote the recovery of atmospheric pressure data, including issues associated with data access, archiving and maintenance
- to promote the comparison of the various types of barometers and pressure sensors (including satellite estimates) used to measure surface pressure
- to report annually to AOPC and OOPC on progress, recommendations and future plans of the Group

Core Membership

Rob Allan (co-convener)
Hadley Centre, Met Office

Climatology

Ed Harrison
(original co-convener)
PMEL

Diagnostics

Gil Compo
reconstruction
(new co-convener)
CDC, NOAA

Daily

Phil Jones
CRU, UEA

Historical analysis

Core Membership

Masao Kanamitsu
NCEP

Reanalysis

Doug Luther
University of Hawaii

Sea level

Bob Seaman
BMRC

**Quality control
and NWP**

Scott Woodruff
CDC, NOAA

COADS/ICOADS

Overview of the Surface Pressure Group Workshop, Norwich 20th –21st November, 2002

**Day 1: Presentations on Historical MSLP data:
compilations and quality control**

**Day 2: Presentations on Historical MSLP: analyses
and data extensions**

Day 1: Presentations on Historical MSLP data: compilations and quality control

David Wuertz : **GHCN project**

Rob Allan: **Hadley Centre MSLP data base**

Gil Compo: **Comparison of ICOADS ship observations with US Historical Weather Maps 1899-1939**

Vicky Slonosky: **Canadian historical MSLP data & future plans**

Theo Brandsma: **Dutch & colonial (Indonesian & Japanese) historical MSLP**

Lars Barring: **Historical MSLP data from Estonia & Poland**

Victor Lagun: **Russian historic Antarctic surface pressure data management**

Phil Jones: **Summary of EMULATE meeting**

Maurizio Maugeri: **Air pressure data in Italy**



Day 2: Presentations on Historical MSLP: analyses and data extensions

Anders Moberg: **Historical MSLP data from Norway, Sweden and Finland**

Gil Compo: **Feasibility of reanalysis before the radiosonde era**

Shyh Chen: **Surface pressure observation: a view from Reanalysis**

Rob Allan (for Nathan Gillett): **Trends in HadSLP and MSLP data**

Scott Woodruff: **ICOADS data**

Tara Ansell: **A new version of HadSLP using ICOADS data**

(A summary of each presentation is available on the Climatic Research Unit, University of East Anglia's web site at <http://www.cru.uea.ac.uk/cru/projects/emulate/>)

Current activities

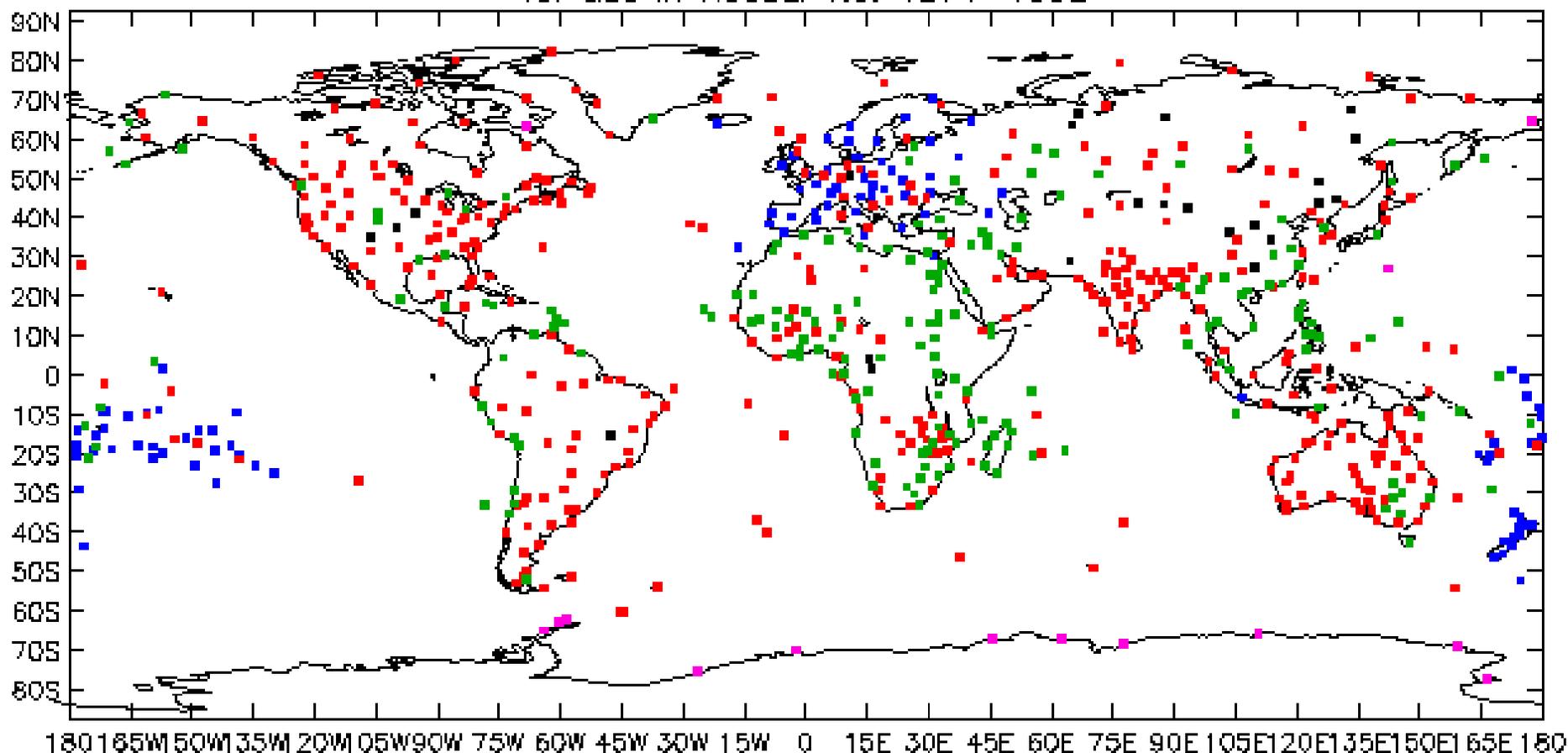
International atmospheric pressure data base

- Aim to set up an international monthly pressure data base for the globe. *Hadley Centre is working on this with US NCDC's GHCN project.*
- Also separate data bases of daily and sub daily observations and, accordingly, the development of an international operational sub daily pressure data base. *EC funded EMULATE project's daily pressure data base back to 1850 is doing this for the Atlantic-Western European sector.*
- David Wuertz and Gil Compo volunteered to be administrators of the monthly and operational data bases respectively, with input from the Hadley Centre.
- No final decision was made about the inclusion of other variables such as wind speed and direction in the data bases and it was agreed to keep this issue open for later discussions.
- The group agreed, if resources permit, it is better to digitise a number of variables at one time, rather than just pressure.
- The need to adopt a uniform data format was recognised. We will work towards using the International Maritime Meteorological Archive (IMMA) format, or a variant thereof, and adapt this to work with terrestrial pressure observations. It is however best suited for the operational rather than monthly data base. *Details of this format are now available as a separate pdf document.*



Aim to set up an international monthly pressure data base for the globe

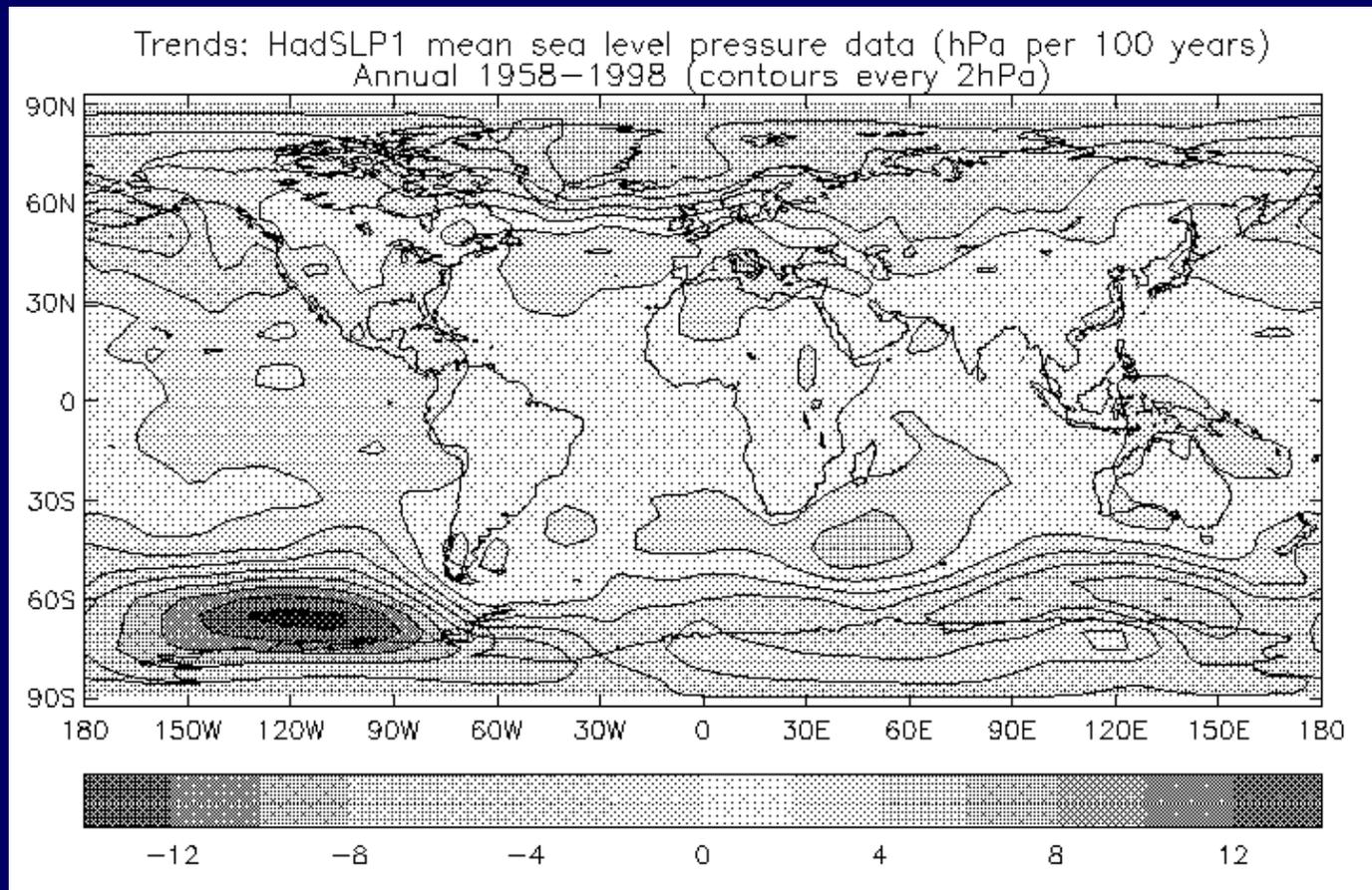
Distribution of New Land Stations and Supplementary Data
for use in HadSLP1.0: 1871–1998



Hadley Centre for Climate Prediction and Research

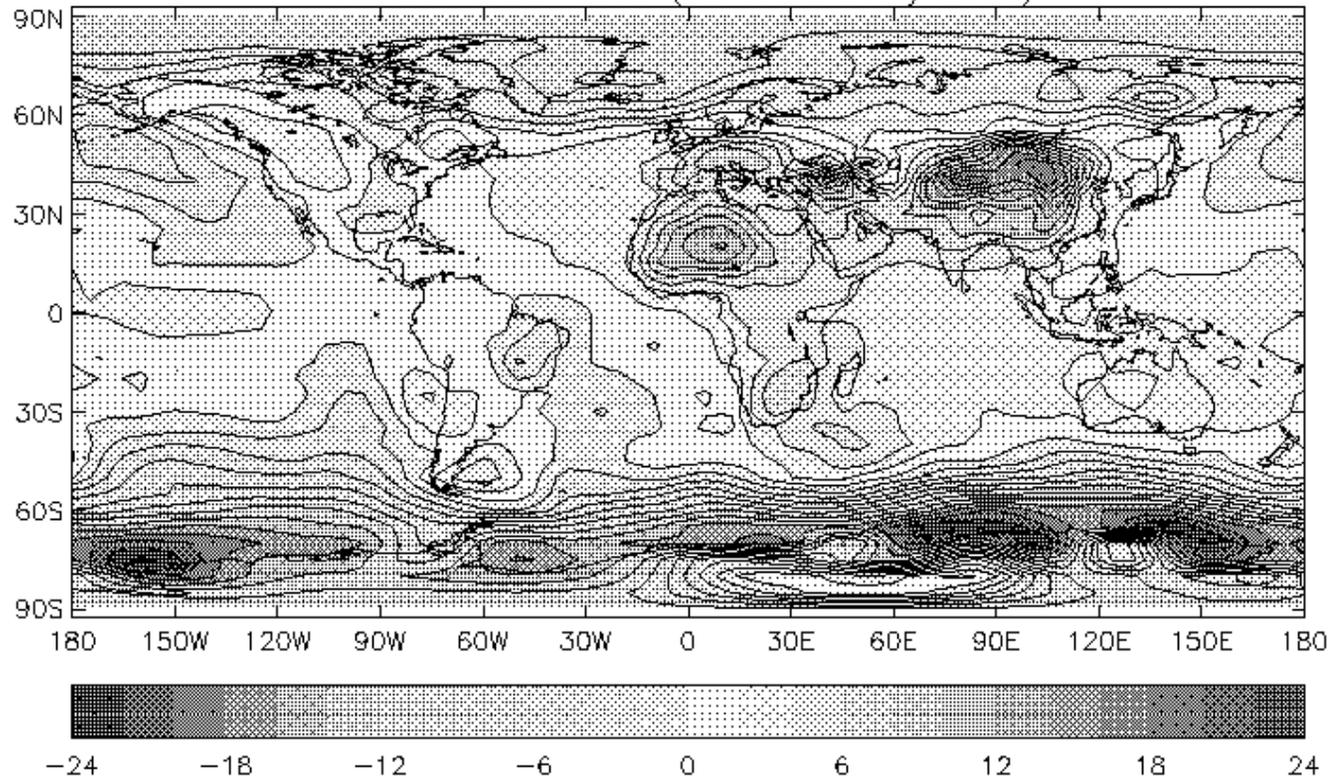
Plotted 08/04/2002

- [1] GHCN/climat (25)
- [2/3] PJ & MJS (104)
- [4] G21 (384)
- [5] climat (15)
- [6/7/8] Supp G21 (181)



Trends in annual-mean sea level pressure from HadSLP1, 1958-1998.

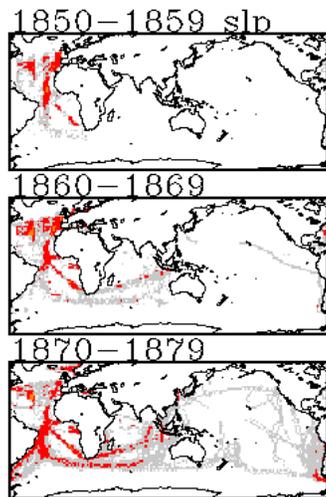
Trends: NCEP Reanalysis mean sea level pressure data (hPa per 100 years)
Annual 1958–1998 (contours every 2hPa)



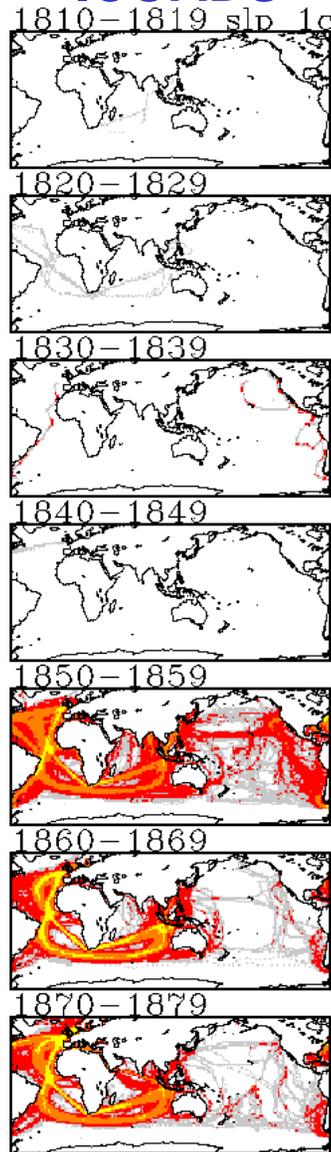
Trends in annual-mean sea level pressure from the NCEP Reanalysis, 1958-1998.

COADS & ICOADS Sea Level Pressure (SLP)

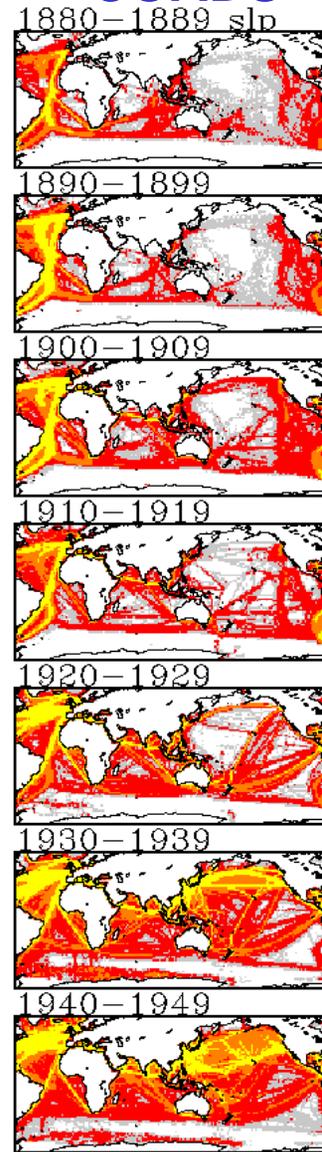
COADS



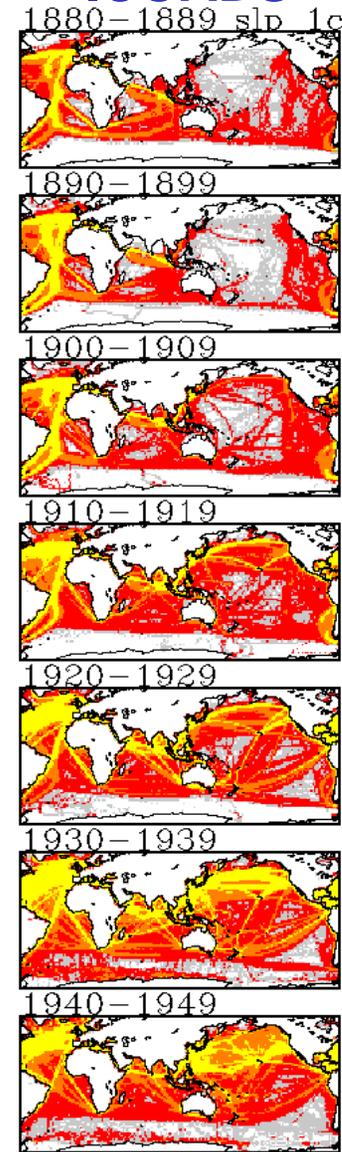
ICOADS



COADS

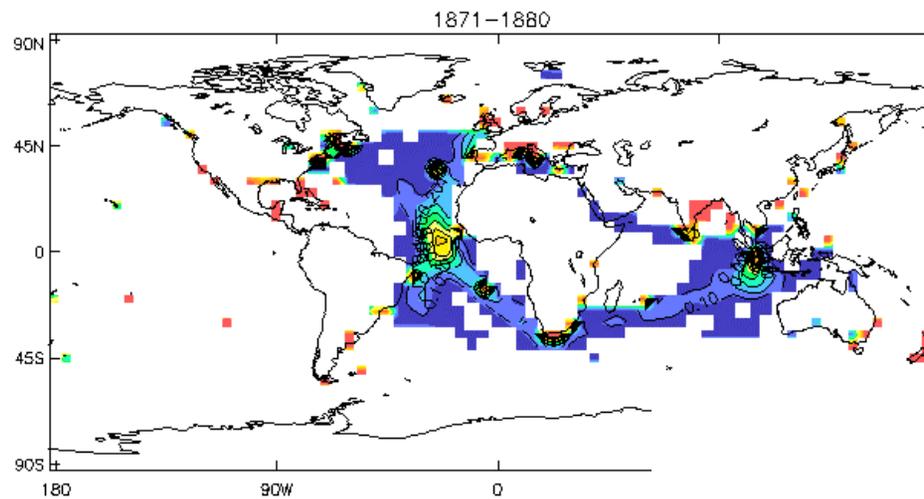


ICOADS



Improved coverage due to ICOADS:

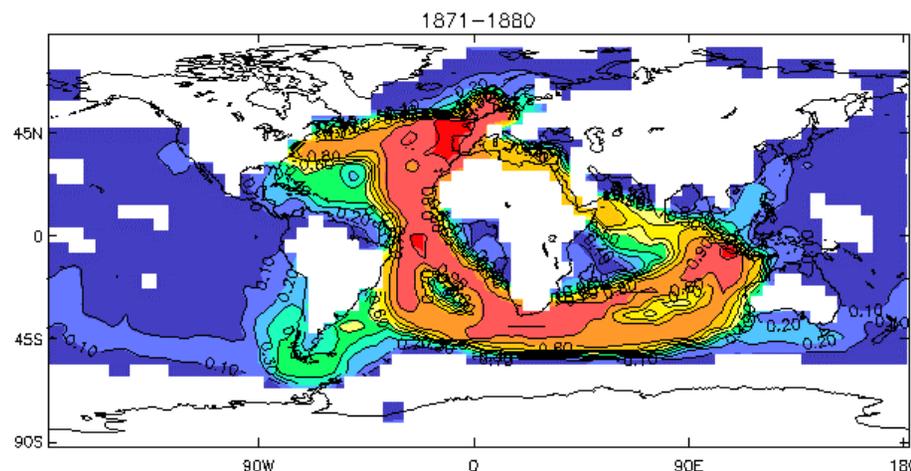
Fraction of months with observations 1871-1880



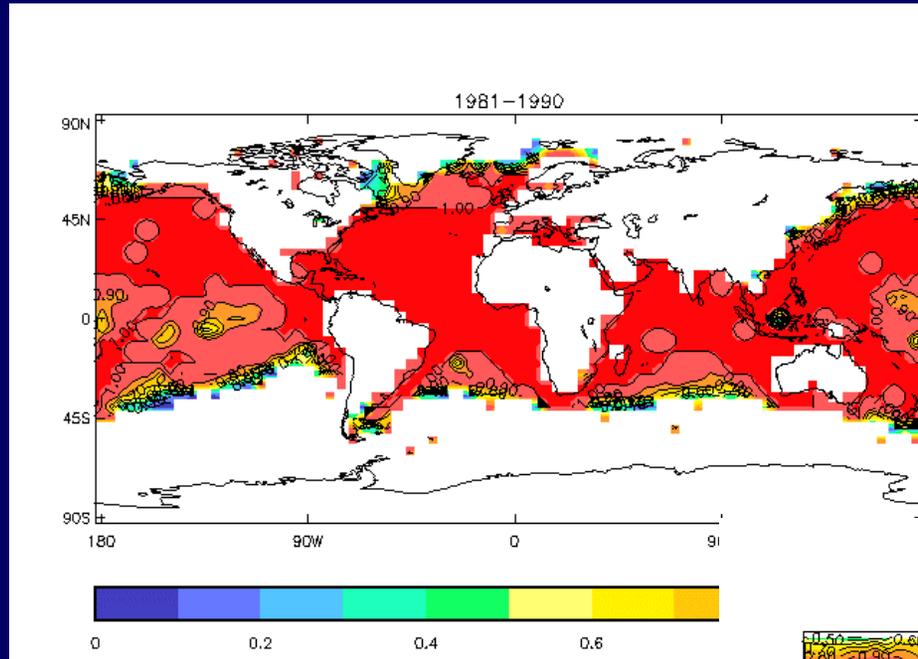
hadSLP2m



GMSLP2.1f

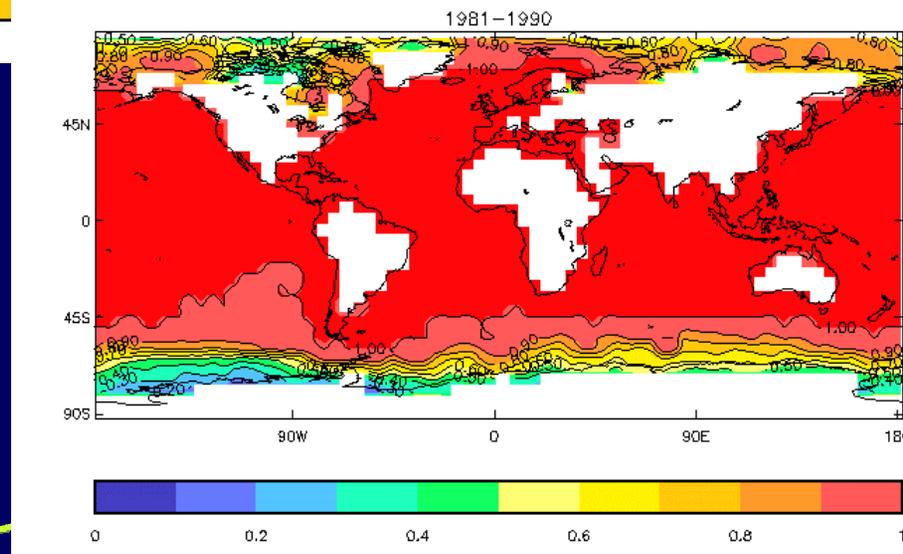


Improved coverage due to ICOADS: Fraction of months with observations 1981-1990



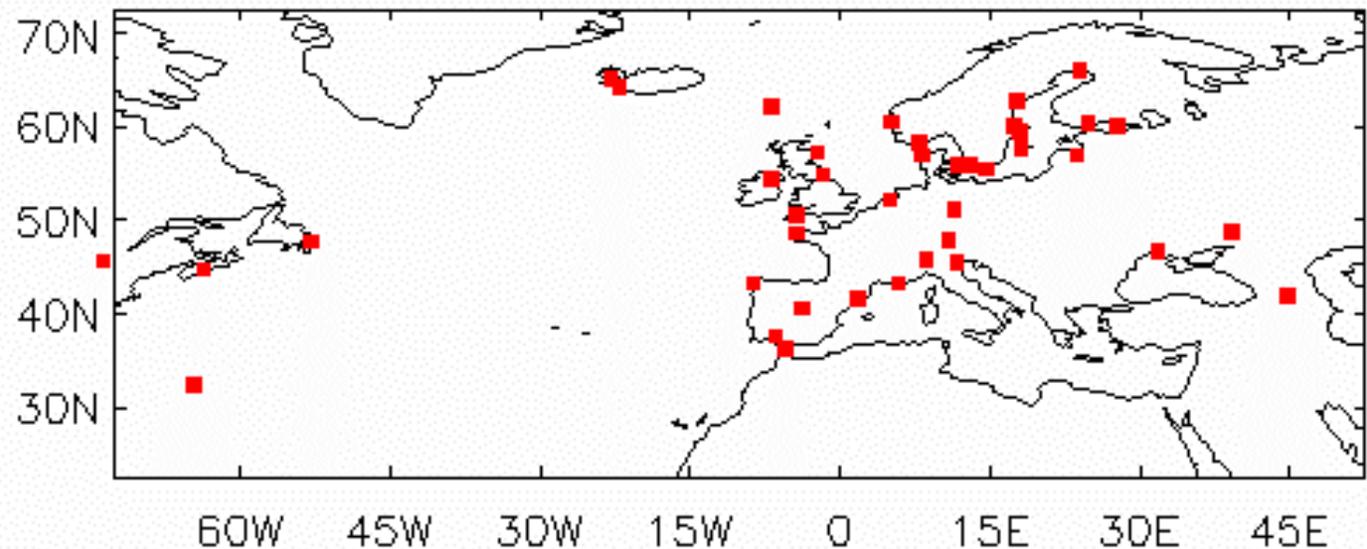
hadSLP2m

GMSLP2.1f

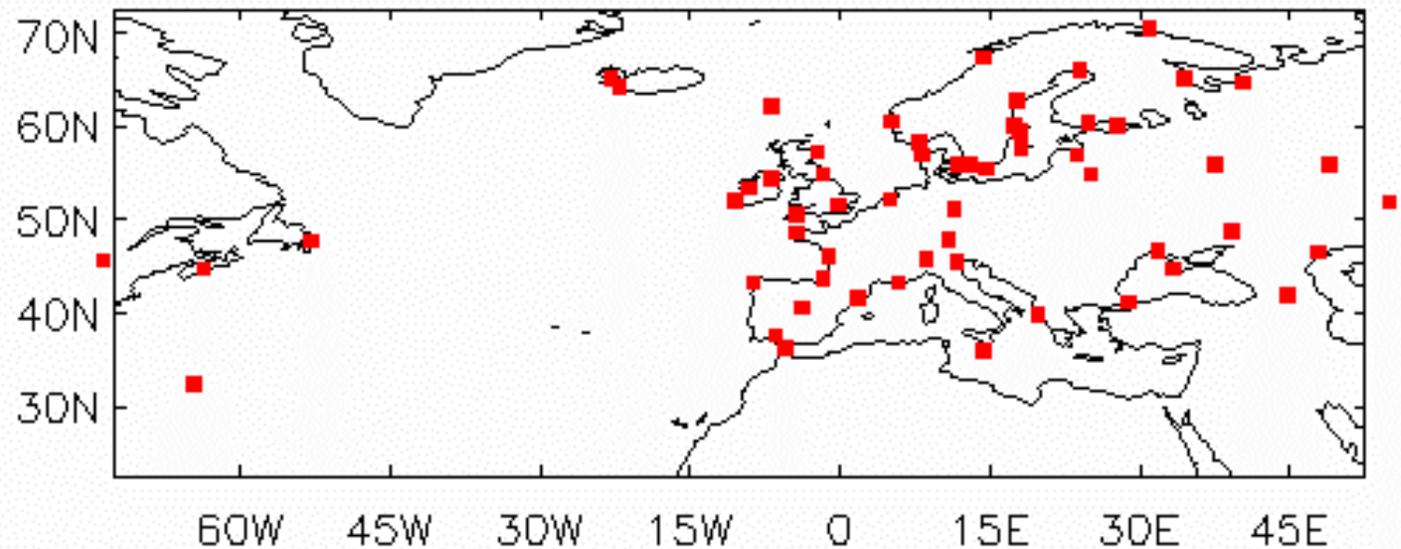


Aim to set up an international daily pressure data base

Land stations included in EMULATE version 1



Land stations to be included in EMULATE version 2



EMULATE: European and North Atlantic daily to MULTidecadal climATE variability

Outstanding data issues

- Need to compare various pressure holdings with the scanned images on the NOAA Library site (http://docs.lib.noaa.gov/rescue/data_rescue_home.html). There are some gaps in NOAA images, and it would be desirable to fill in the missing years. *This has been communicated to the NOAA Library and to a major source of such material, the Met Office Library/Archives.*
- Rob Allan and Tara Ansell to check for the Hong Kong daily records in the Met Office's library. *We have found some daily observations from 1853-1862, 1866-1886 since the meeting. We will keep searching!*
- David Parker to investigate the Gordon Manley pressure records. *Since the meeting David has been able to find evidence that Gordon Manley did indeed collate pressure observations and there appears to be coverage for London from 1770.*
- We have the potential to take the London and Paris records back to the 17th Century, possibly earlier. Phil Jones commented that despite their relatively close proximity, London and Paris are quite different series and actually provide a good measure of the North Atlantic Oscillation (NAO).

Some examples of long barometric pressure records which have been recovered are shown.

Reanalysis fields

- The group agreed to Phil Jones' recommendation to write a formal letter, acting on behalf of AOPC, to ECMWF requesting that their reanalysis data be made freely available. *The co-convenors of the AOPC pressure working group will write the letter, to then be approved by the members of AOPC and forwarded on to ECMWF by the head of AOPC.*



Recovery of long barometric pressure records

MADRAS MSLP 1796-2000

<http://www.cru.uea.ac.uk/cru/data/madrasmstp.htm>

— MADRAS MSLP
— Linear (MADRAS MSLP)

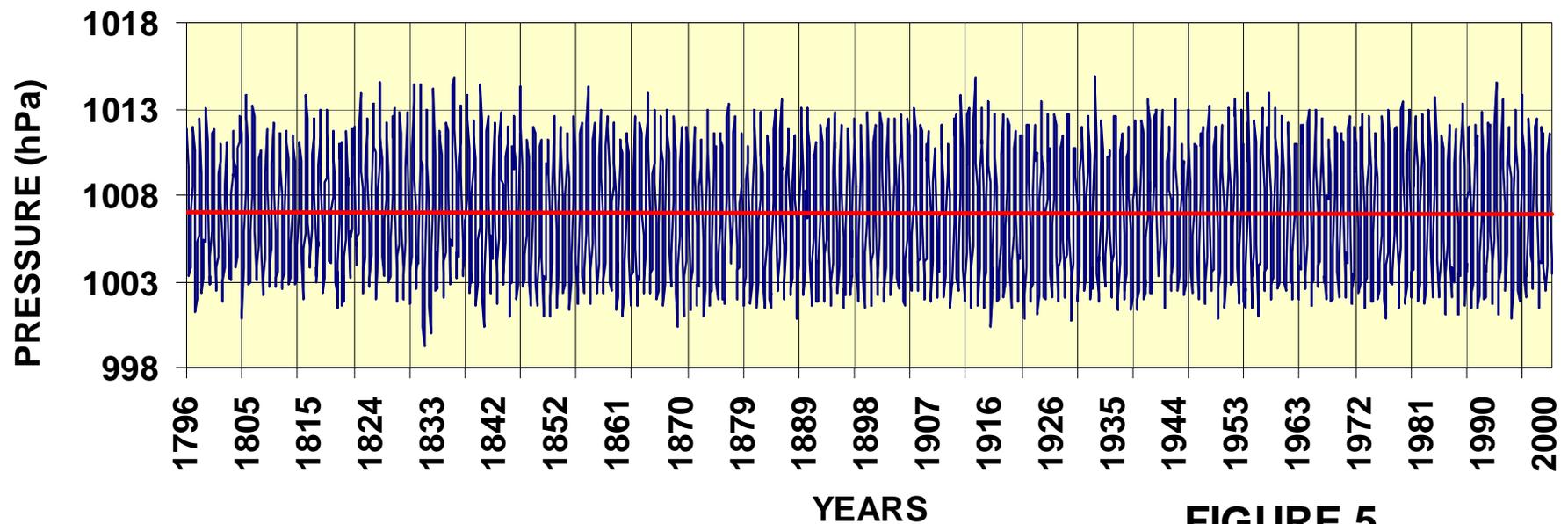
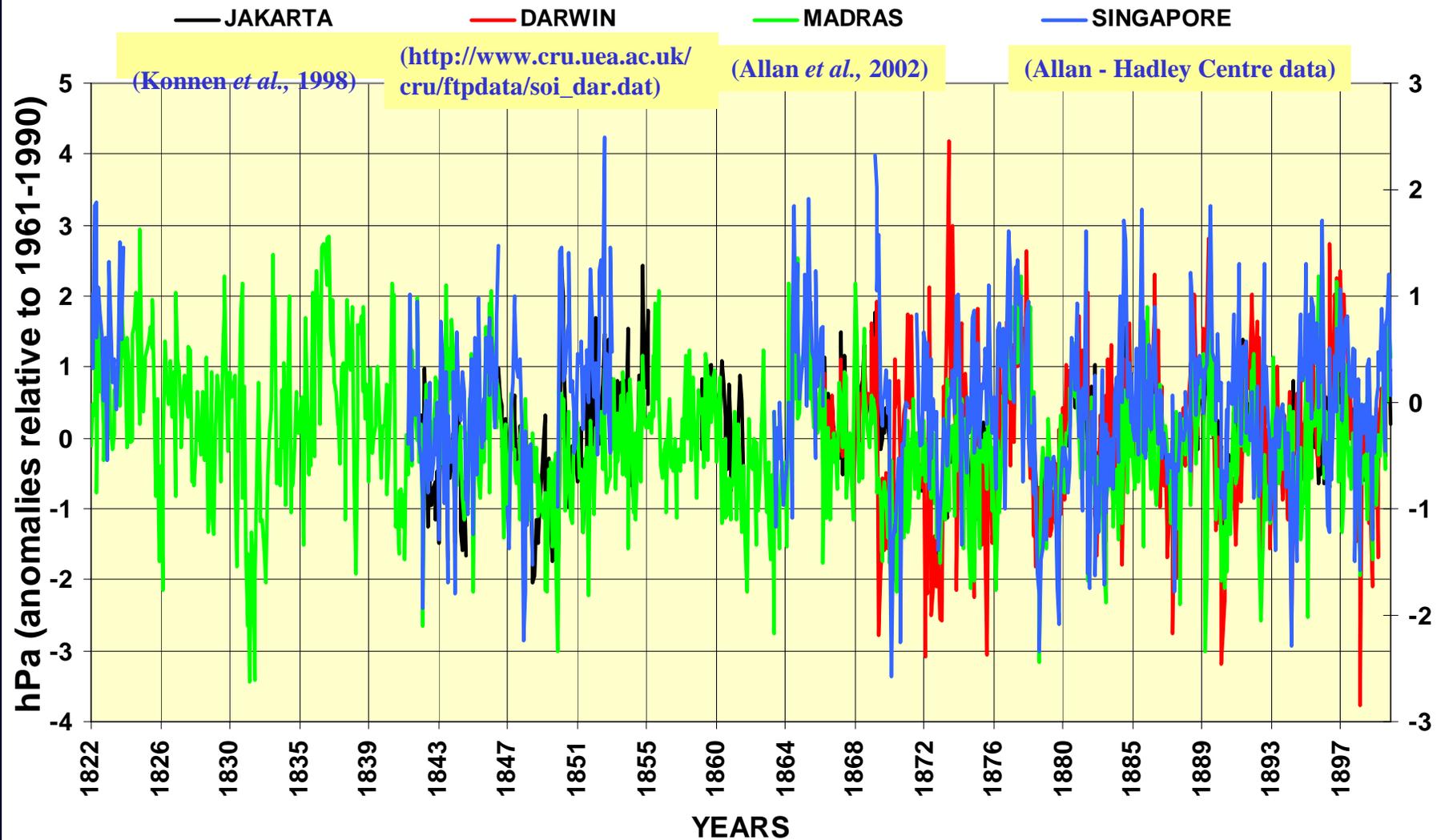


FIGURE 5

INDO-AUSTRALIAN MEAN SEA LEVEL PRESSURE



Homogenisation of series

- Phil Jones requested that series should be homogenised according to the current operating standard (i.e. observing hours and/or averaging scheme), thereby preventing the need for further adjustments when blending in current observations.

Errors

- One recommendation from the Boulder Workshop in 2002 was to produce, in time for the 4th IPCC assessment, grid box uncertainties and error covariance structures in gridded MSLP products. The group was asked to consider the following issues:
 - Can we look simply at the number of observations per day?
 - Are there any consistent errors, such as urbanisation effects with temperature?
 - Any gross potential bias?
 - Do we want to ignore / reject the very high altitude stations or how should we handle them?

This will be reviewed at follow-up meetings.

Historical wind data

- The Terms of Reference of the AOPC/OOPC MSLP Working Group should be expanded to include the homogenisation and analysis of surface winds, especially over the oceans, and their consistency with surface pressure. This will be discussed tonight at an informal meeting of Group members who are attending the CLIMAR-II Workshop.

Issues

- Atmospheric pressure sensors on drifting buoys, especially in the Southern Ocean.
- Letter from AOPC to ECMWF concerning re-analysis data being made more freely available.
- Co-ordinated approaches to meteorological services around the globe to liaise with the Group on the construction, extension and quality control of long barometric pressure data series for the international atmospheric pressure data base => liaise with ECA, GSN & others. This would include hard copy records and digitised data, which would be quality controlled and ultimately fed back to these services and be available through the international data base.
- Digitisation of old historical barometric pressure observations from the records of land stations and ship's logs of the Hudson's Bay Company held in archives in Canada => full data to ICOADS (<http://www.gov.mb.ca/chc/archives/hbca/about/holdings/classify.html>)
- Locate and retrieve long old historical barometric pressure observations made by missionaries across the globe => a major collection is held by the Francke Foundation at Halle in Germany.
- Look to engage past professionals and interested persons to aid climate researchers in the location, retrieval, digitisation, quality control and storage/archiving of historical instrumental meteorological/climatological data variables around the world. Proposal put to the Royal Meteorological Society's History of Meteorology and Physical Oceanography Group and the concept has been communicated to the International Commission on the History of Meteorology.