

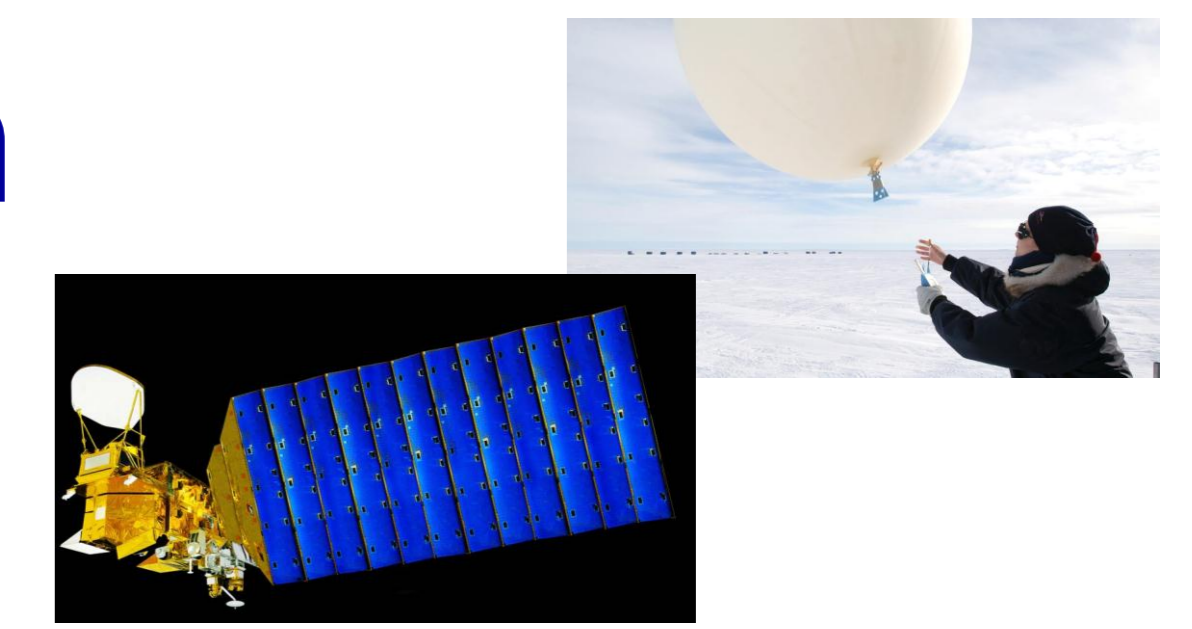


Australian Government
Bureau of Meteorology

AIRS Radiosonde Validation Campaign

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Bureau of Meteorology AIRS Radiosonde Validation Campaign

The Bureau of Meteorology AIRS Radiosonde Validation Campaign aims to benchmark and support improvement of hyperspectral infrared sounding and numerical weather prediction over land. In particular, it is hoped this study will be used in improving the surface emissivity assumptions for Australia which effect the retrieved values from AIRS.

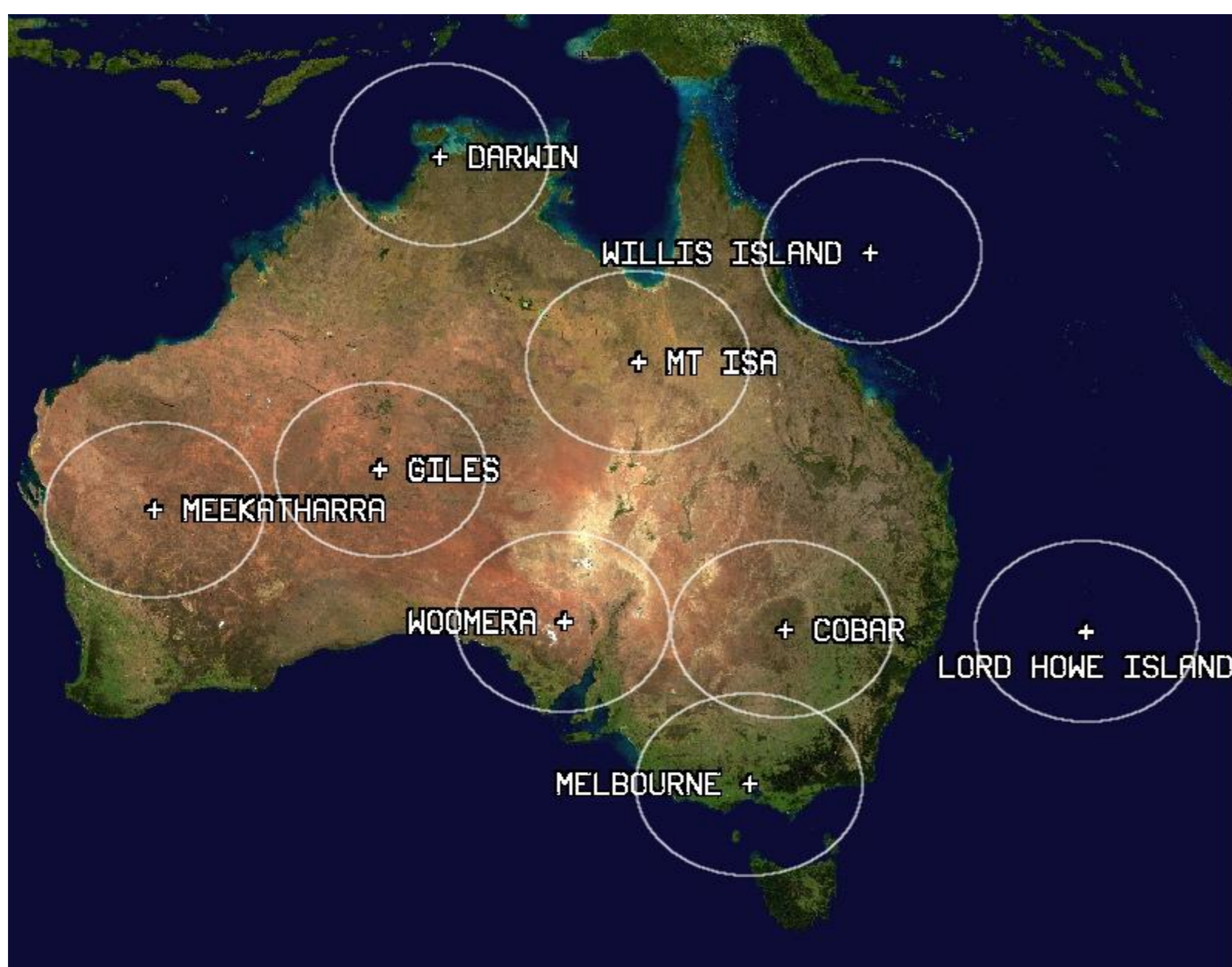
For this, we need high quality spatially and temporally comparable AIRS and IASI, and radiosonde datasets over several Australian locations in different climate zones and seasons.

The Bureau's current standard operations sonde launch schedules complement IASI passes.

For AIRS, the program will total 318 sonde flights over an approximate two year period. The program launches are spread over the summers and winters for the two years, with a preference for two thirds of the launches in the first two seasons.

The first winter campaign July to October 2009 is complete with all satellite, sonde and weather station data available upon request.

Radiosonde launch stations



The first and second campaigns are complete with the following launches per station per campaign.

Most notable are the limited launches from the islands and in the summer campaign, from Darwin.

Launch schedules require complementary satellite overpasses, however if cloud is present launches are cancelled.

The two campaigns have yielded 153 comparable sonde flights and AIRS overpasses.

| | Cobar | Darwin | Giles | Meekatharra |
|--------|-------|--------|-------|-------------|
| Winter | 14 | 14 | 17 | 27 |
| Summer | 3 | 0 | 4 | 11 |

| | Melbourne | Mount Isa | Willis Island | Woomera |
|--------|-----------|-----------|---------------|---------|
| Winter | 4 | 14 | 4 | 11 |
| Summer | 7 | 8 | 2 | 13 |

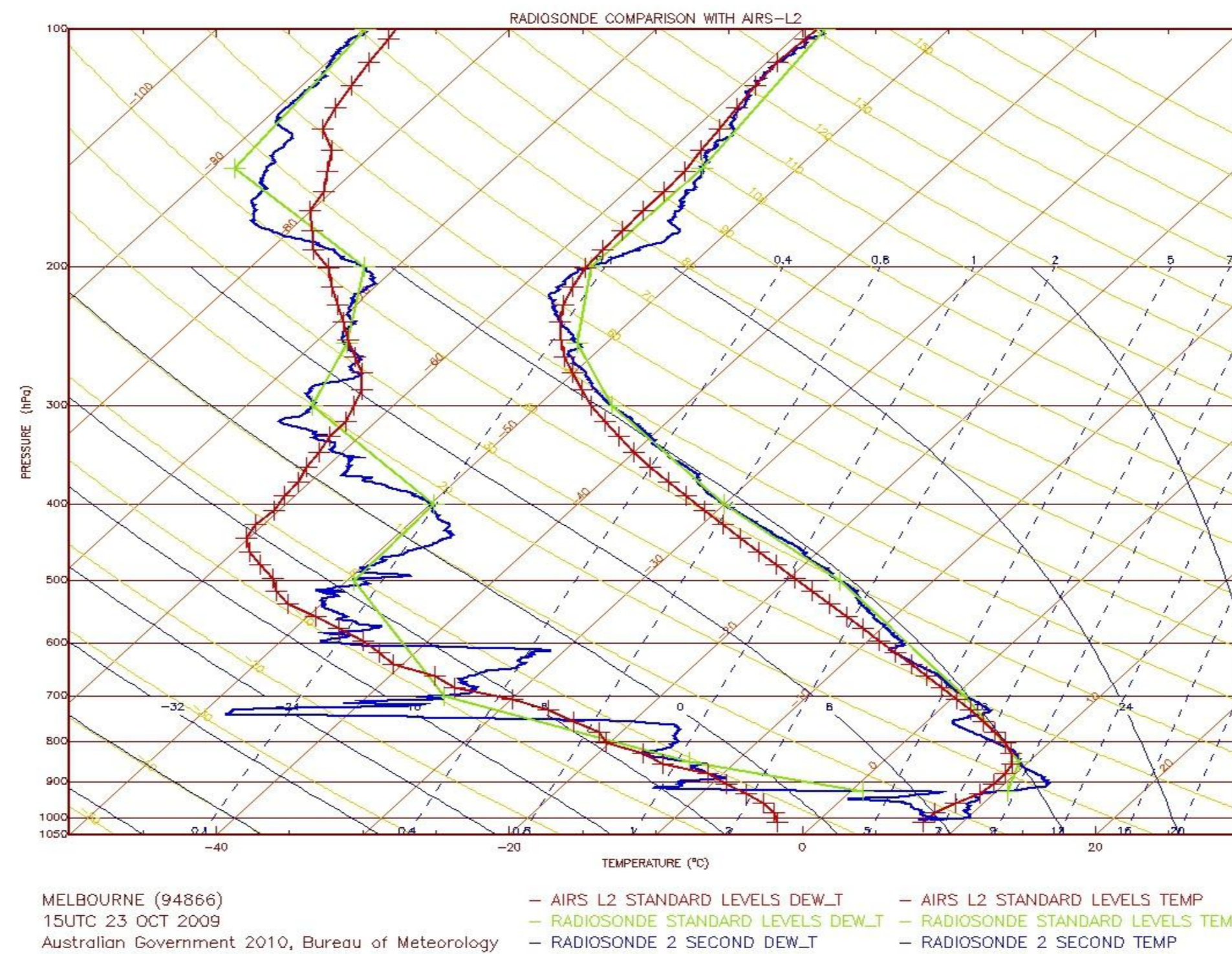
The third and fourth campaigns are scheduled for July through October 2010, and January through March 2011.

Contact for enquiries and access to data

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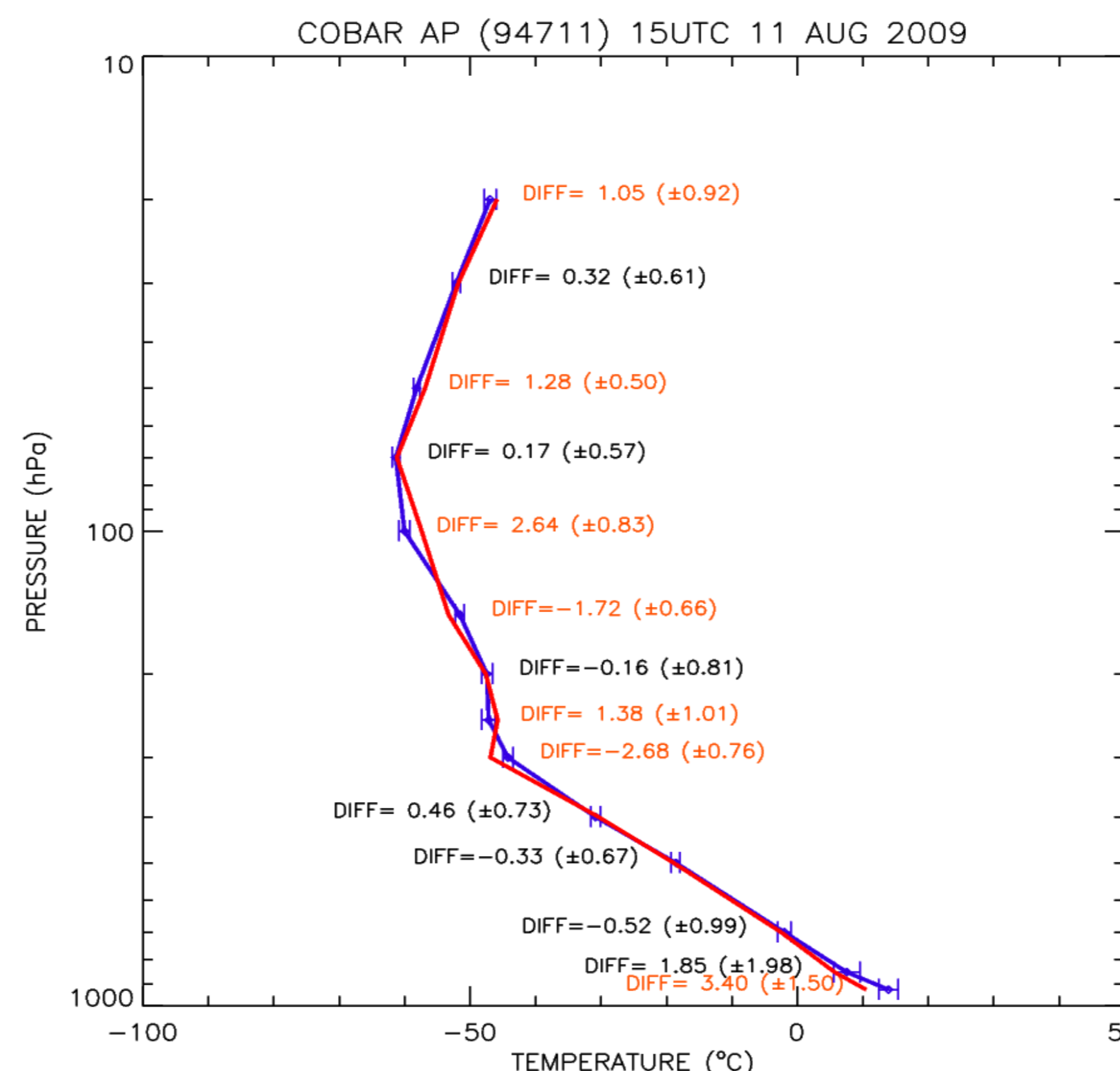
Phone: +61 3 9669 4911

Log T Skew P Plot



Bureau forecasters have relied on Log T Skew P plots for visualisation of radiosonde data for decades. Our intention is to provide real time, calibrated AIRS temperature and dew point temperature profiles in this format. The adjacent figure shows an AIRS temperature retrieval compared with a collocated sonde launch on 23rd October 2009 from Melbourne Airport.

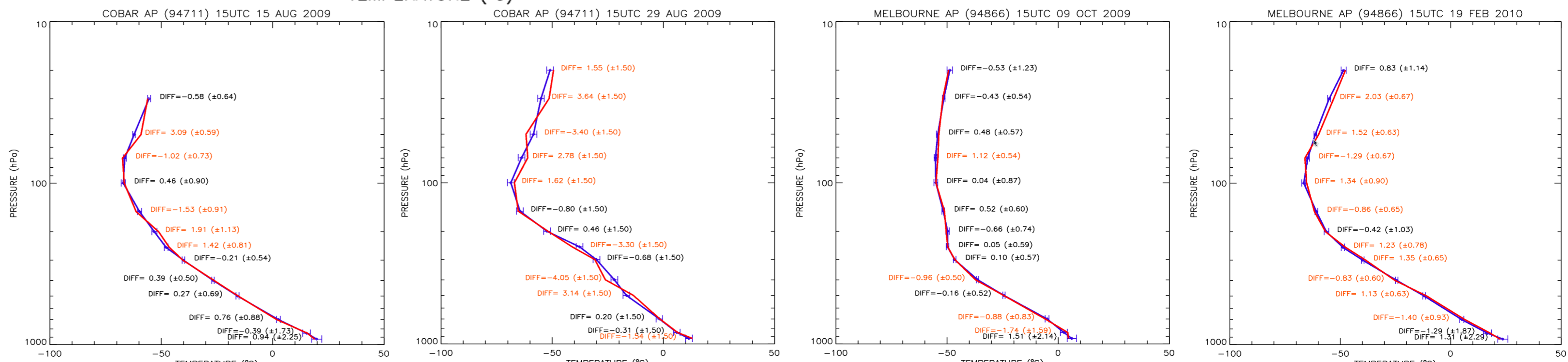
Temperature retrieval accuracy at Cobar and Melbourne Stations



Analysis of AIRS and Radiosonde temperatures were made for the available Cobar and Melbourne station sonde launches from both the winter and summer campaigns.

The temperatures at the 27 standard pressure levels were compared. Examples of these comparisons are shown to the left and below, with AIRS temperatures (and Standard Deviations) in blue and sonde profiles in red. Each point has associated with it the temperature difference between the two profiles and the AIRS standard deviation. Black text indicates differences that fall within the AIRS standard deviation and red outside.

Temperature data was derived using IMAPP¹.

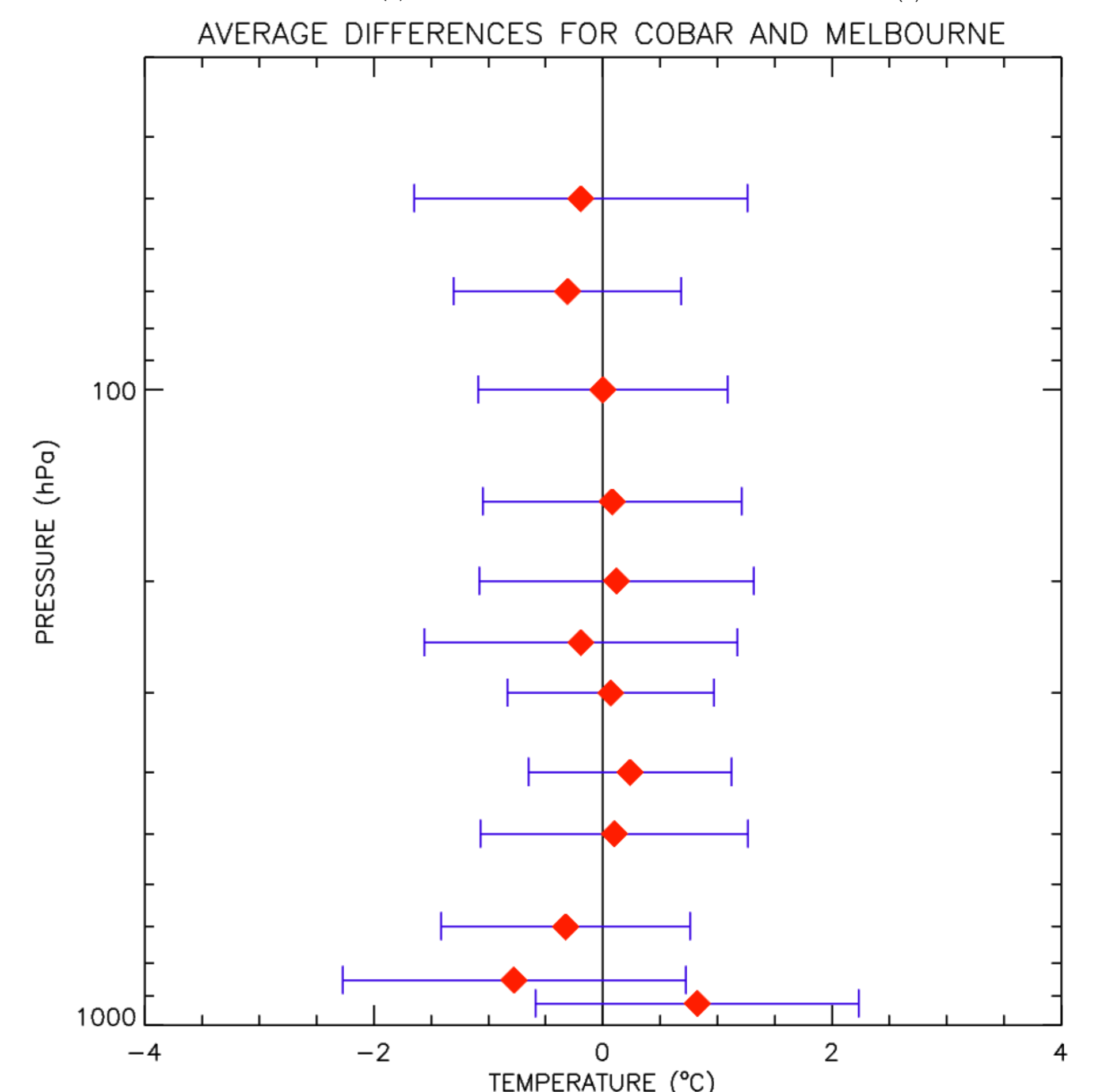


Above are plots of the best and worst of the Cobar and Melbourne station comparisons. These images are an encouraging first evaluation with even the poor examples comparing reasonably and showing the inherent temperature trend.

On the right are the average differences for the fifteen available matching data sets for Cobar and Melbourne. The errors are the standard deviation of the average.

Clearly all the average differences for this data fall within $\pm 1K$ with error bars encompassing the ideal zero difference.

This preliminary study indicates; a) the Validation program is an effective tool for comparing the two data sets, and b) considering the temporal differences in the data, both compare favourably.



¹ Huang, H.-L., Gumley, L.E., Strabala, K., Li, J., Weisz, E., Rink, T., Baggett, K.C., Davies, J.E., Smith, W.L., AND Dodge, J.C., INTERNATIONAL MODIS AND AIRS PROCESSING PACKAGE (IMAPP) - A Direct Broadcast Software Package for the NASA Earth Observing System, AMERICAN METEOROLOGICAL SOCIETY FEB, 2004