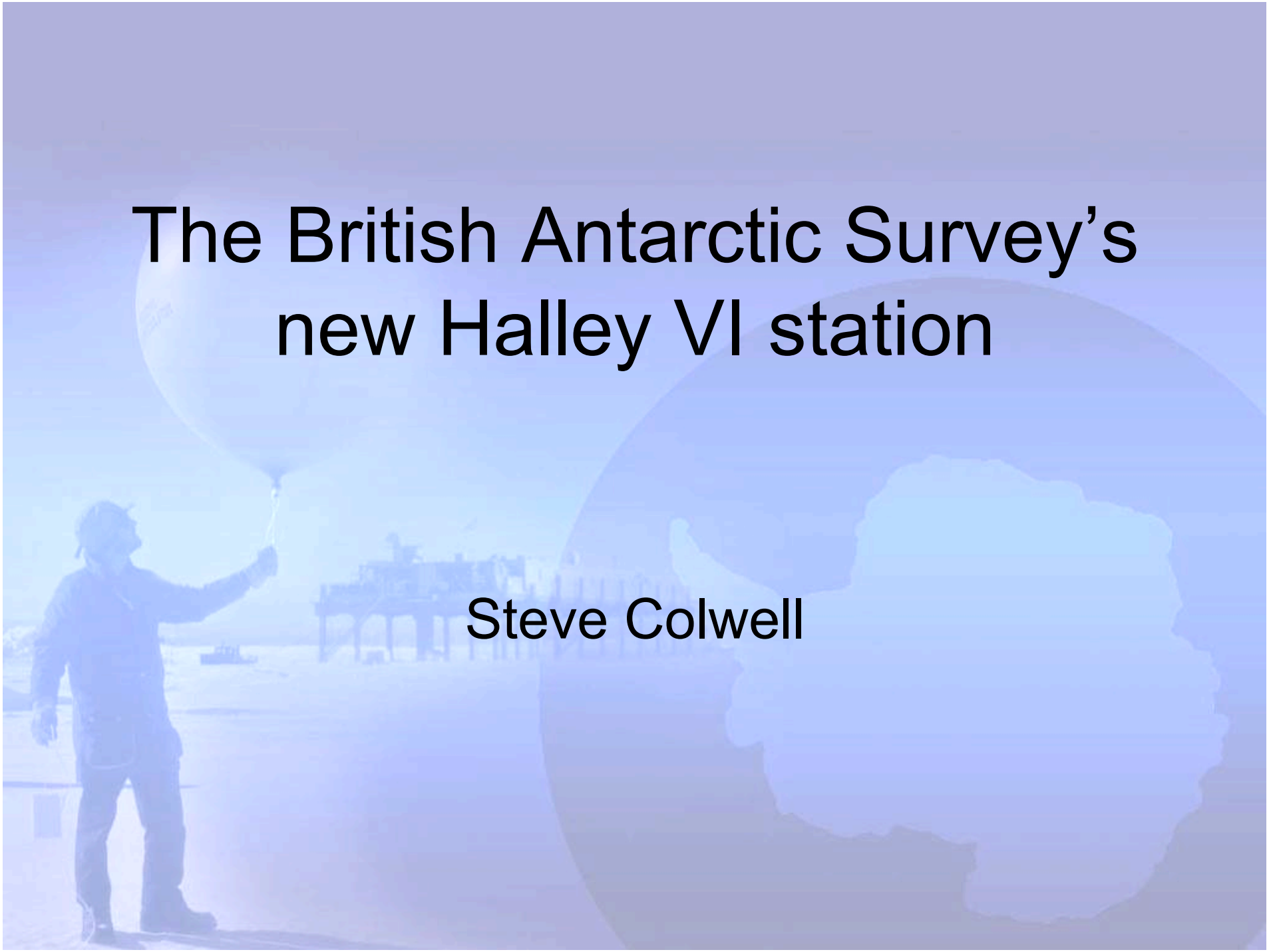
The British Antarctic Survey's new Halley VI station



Steve Colwell

Overview

- The history of the Halley stations.
- The new Halley VI station.
- Comparison of meteorological conditions between the two sites
- The meteorological equipment that will be installed at the Halley VI site


0 kilometres 1000
South America
Falkland Islands
Bird Island
King Edward Point
South Georgia
Larsen
Rothera
Fossil Bluff
Butler
Limbert
Sky-Blu
Halley
West Antarctica
East Antarctica
Baldrick
60°S
75°
120°W
105°
90°
75°
60°
45°
30°
15°
0°
15°E

Halley I

- This station operated from 1956 until 1967.
- By the time Halley I was abandoned it was 14 metres deep, and the temperature of the living and sleeping facilities had dropped to -18C.

Halley II

- Operated from 1967 until 1973.
- It was also made up of a series of wooden huts, but the roofs were reinforced with steel supports to help support the weight of the snow. Unfortunately this proved no more successful

Halley III

- Operated from 1973 until 1983
- It was the first station specifically designed to be able to cope with being buried by the ice. The buildings were prefabricated huts surrounded by corrugated steel conduits, which helped prevent the movement of the ice from crushing the structures inside.

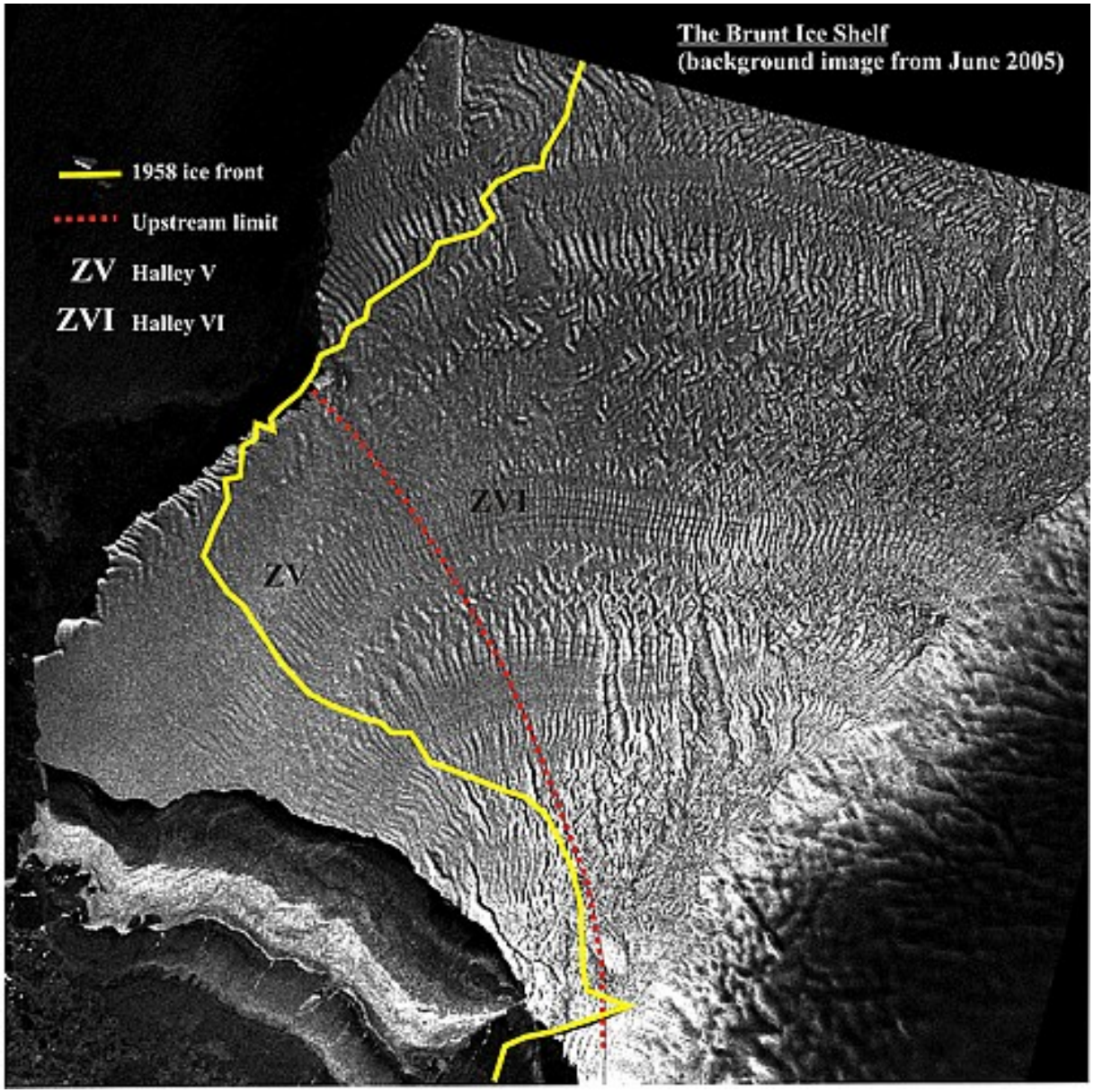
Halley IV

- Operated from 1983 until 1991
- Unfortunately windtails that formed while the base was being buried warped the cylindrical shape.
- Voids had to be created in the snow above the station to stop it being crushed.

Halley VI

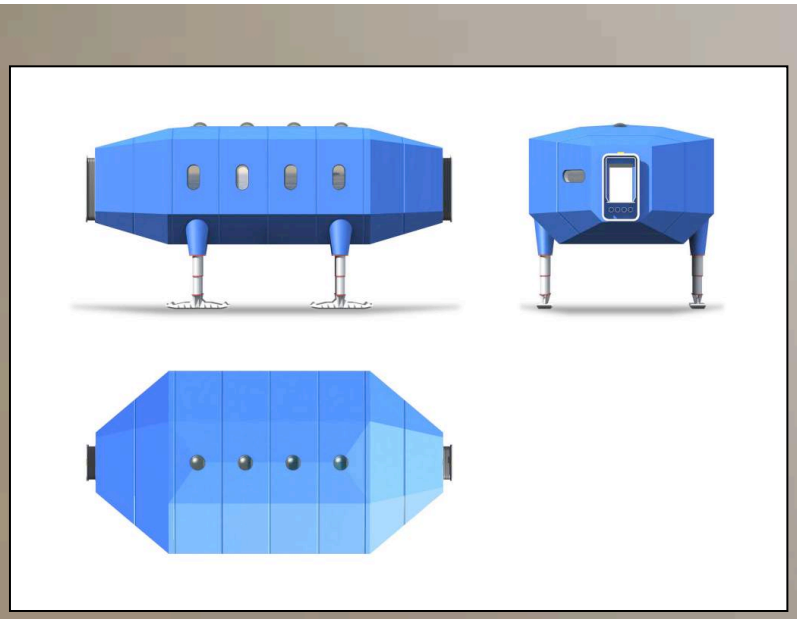
- Operated from 1990 until present.
- It consisted of three wooden structures built on jackable steel legs to keep them above the snow surface.

Why build Halley VI?



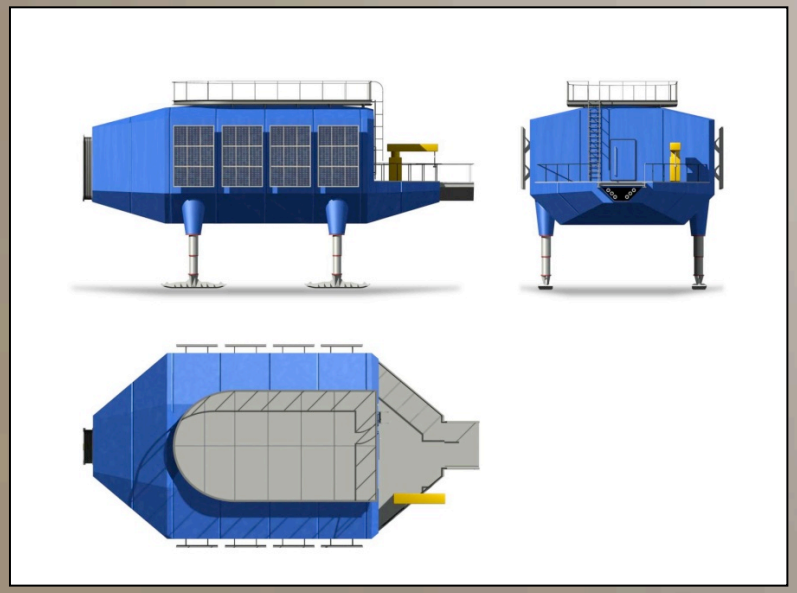
Increased Risk of This after 2010!!

Standard Modules

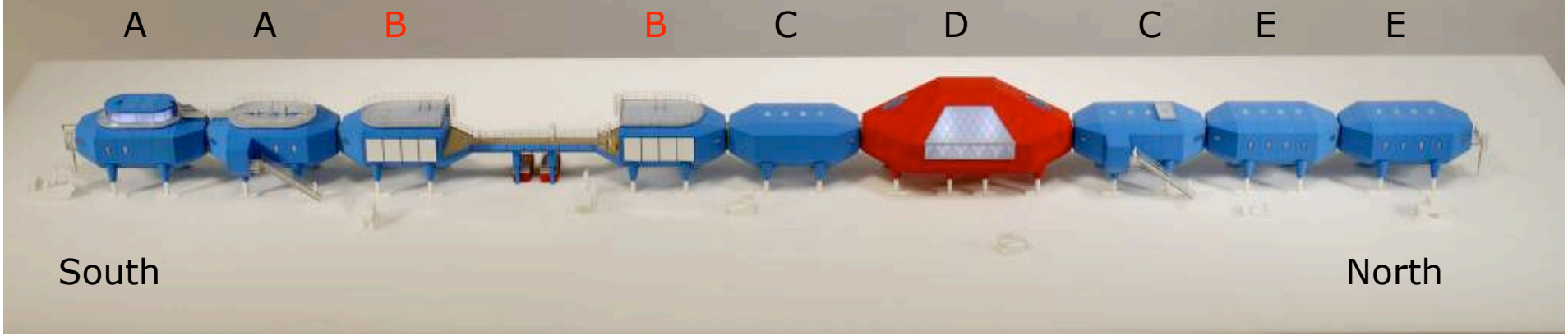


- Science labs and offices (A)
- Station support facilities (C)
- Sleeping areas (E)

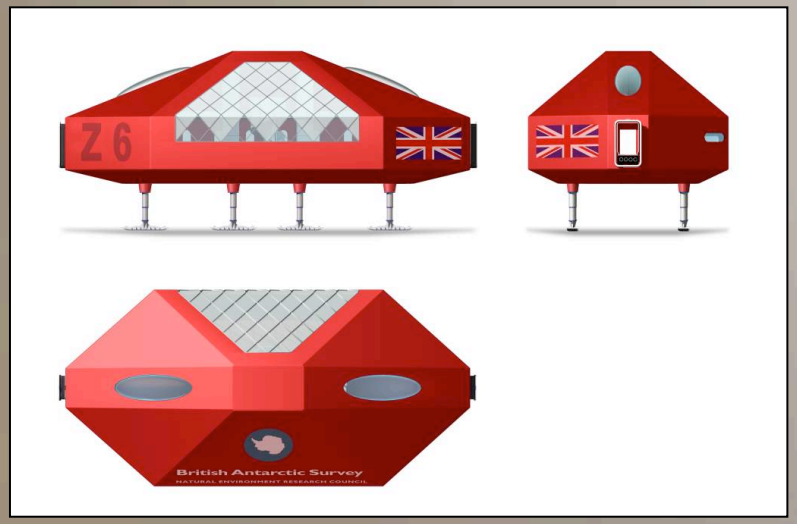
Energy Modules



- Power generation
- Water generation and storage
- Sewage treatment
- Fuel storage
- Waste management facilities



Central Module

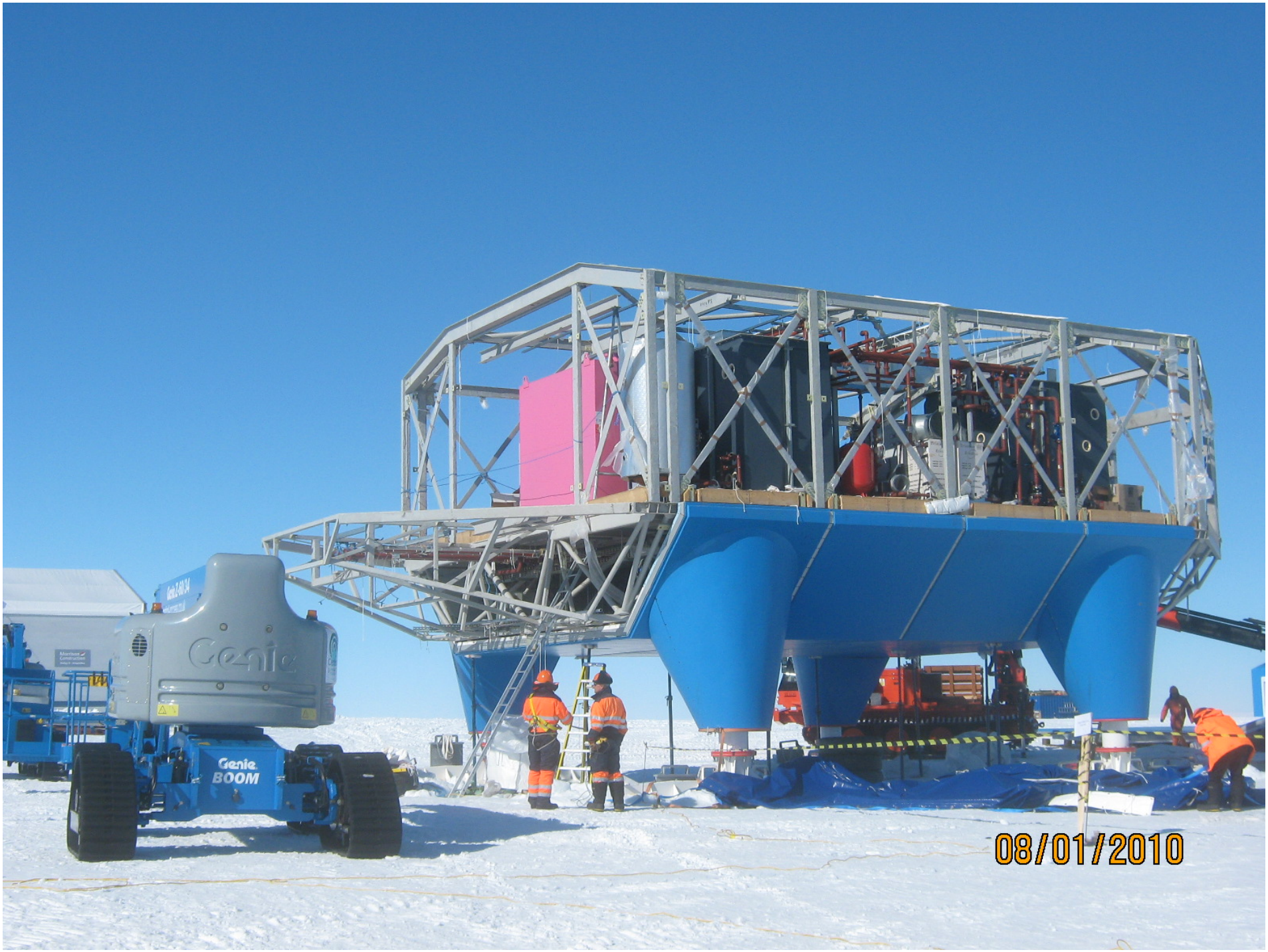


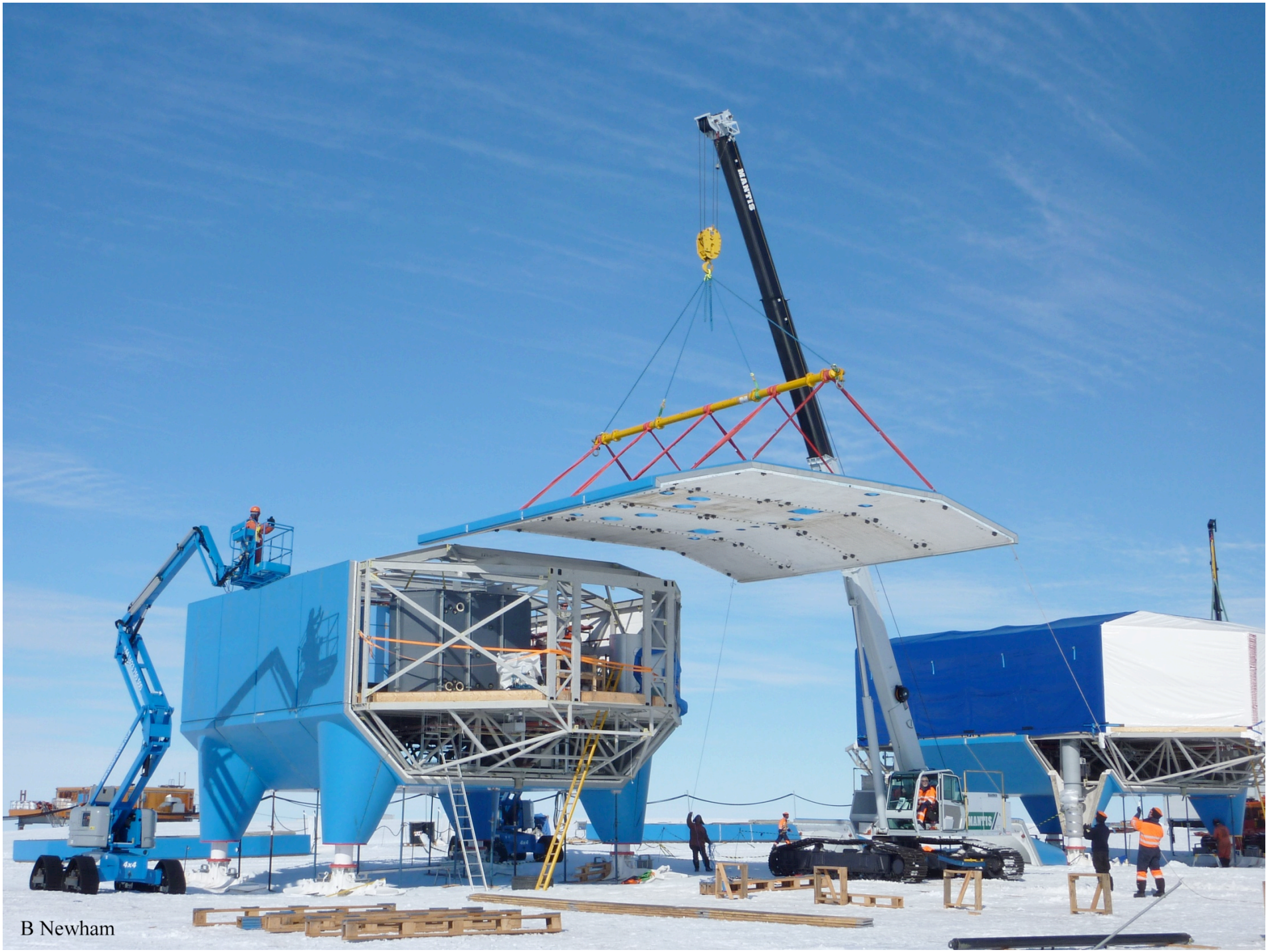
- Dining room
- Kitchen and food storage
- Lounge and bar
- Games area and Gym
- Meeting Room
- TV Room

A A B B C D C E E

South North


FESCO
ERNEST SHACKLETON


Genie
Genie
BOOM
08/01/2010



B Newham


MANTIS
MANTIS
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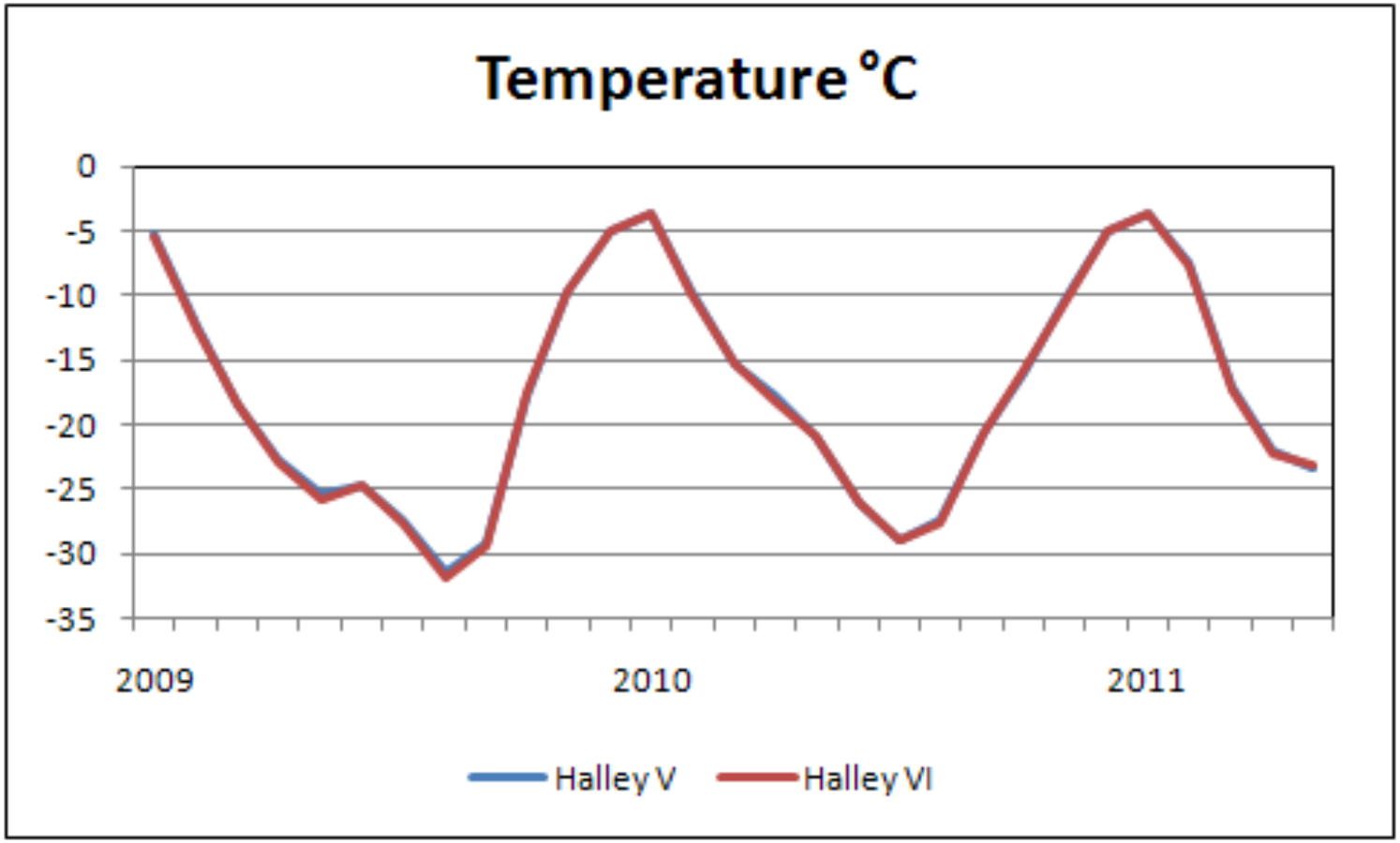
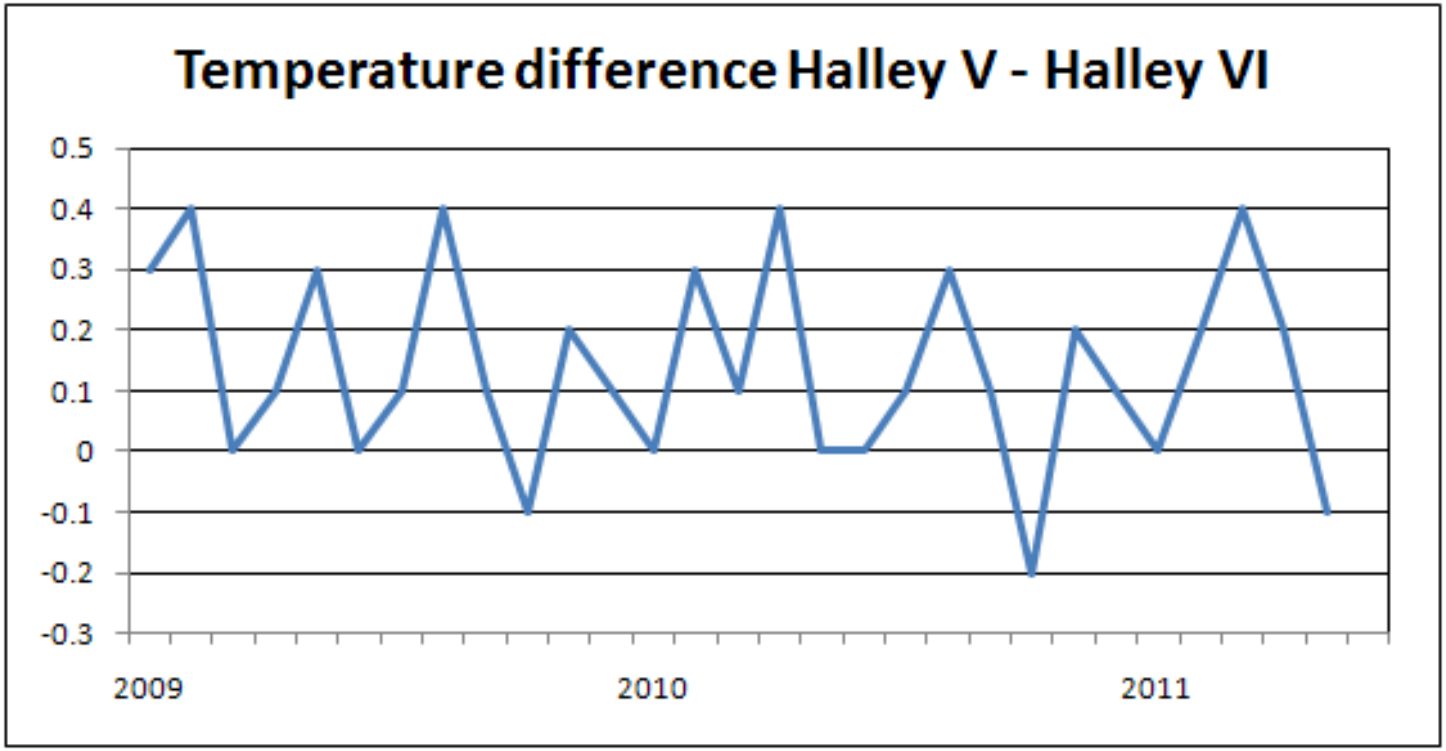
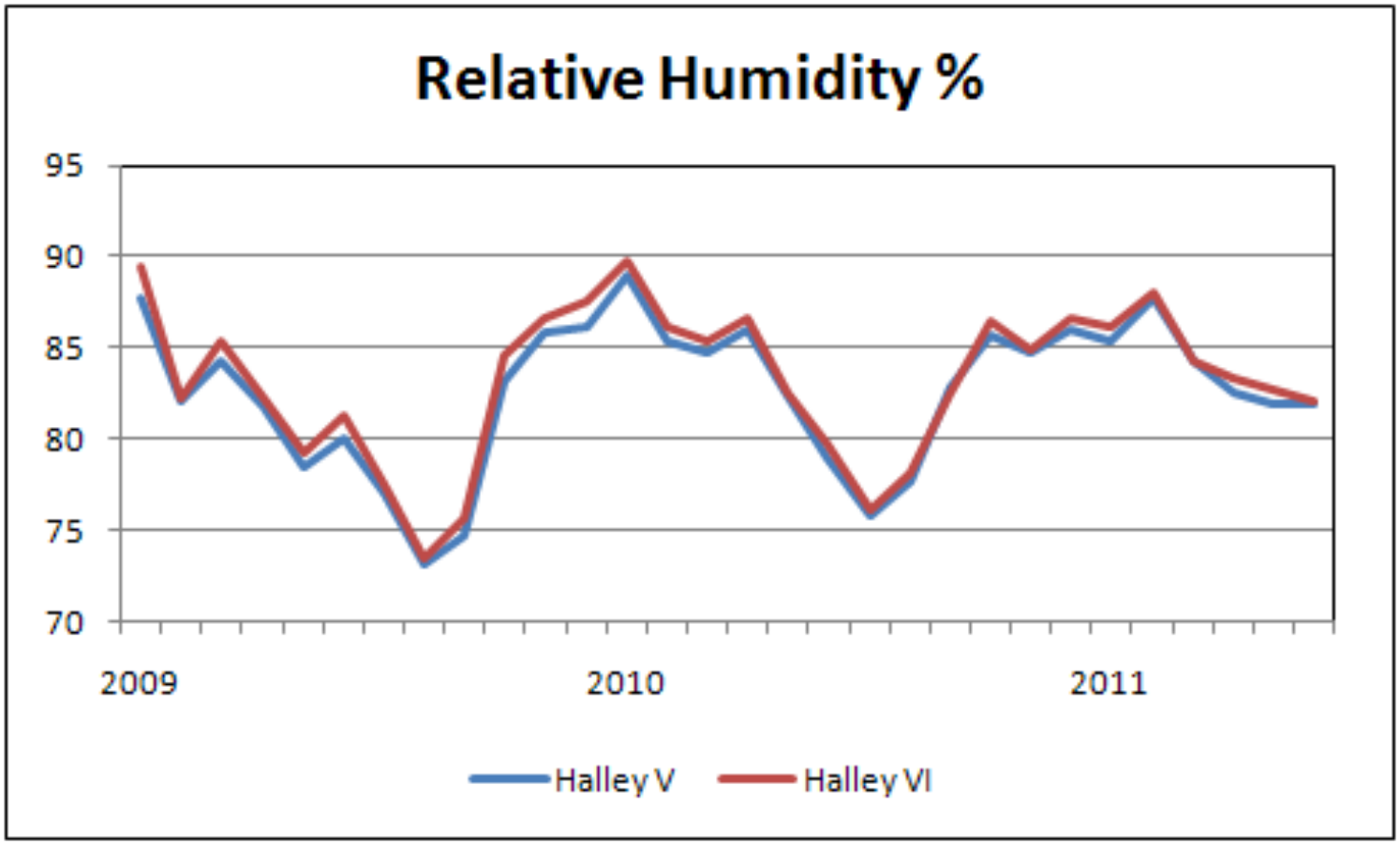
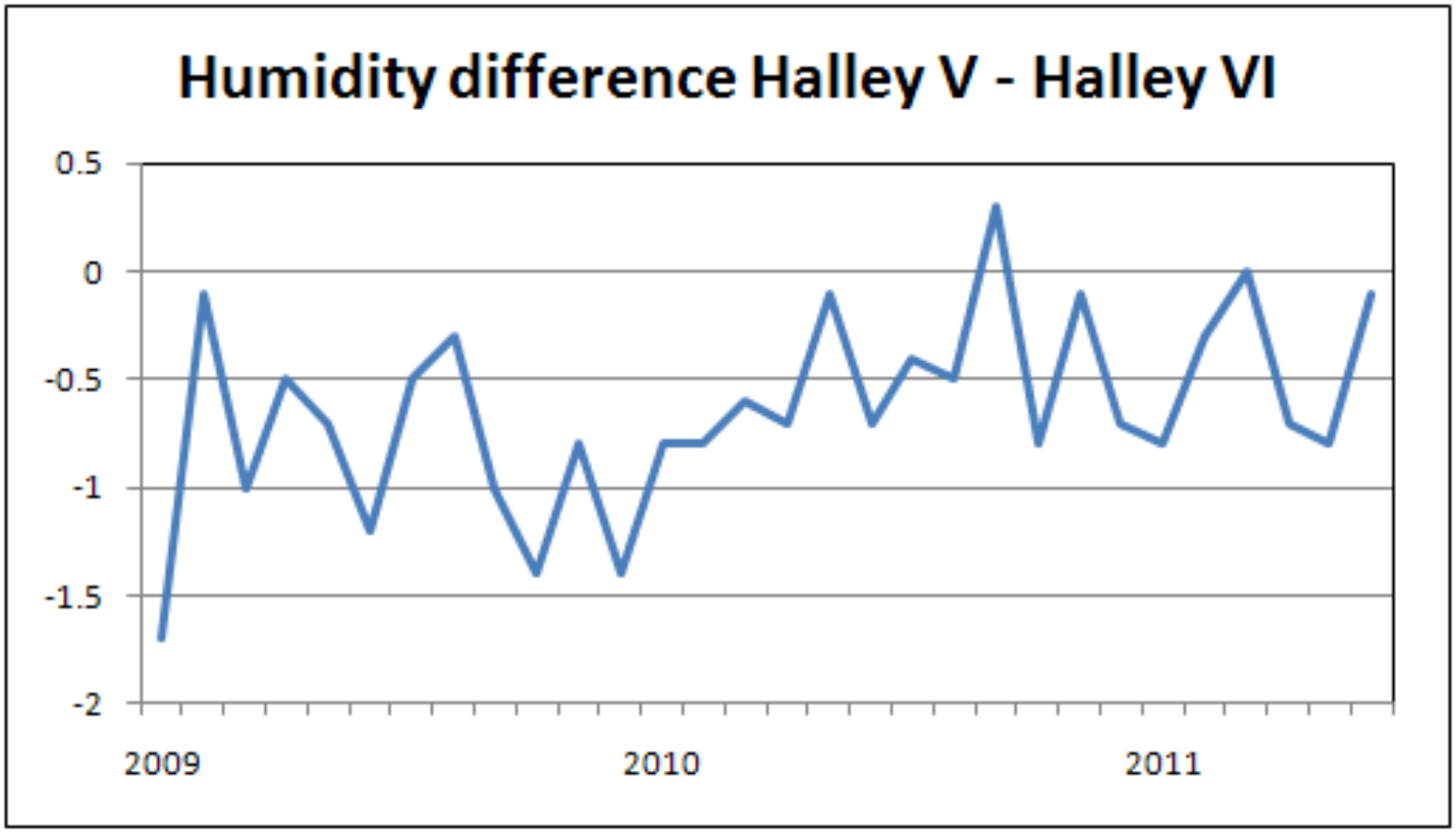
Antarctic Survey
MANTIS

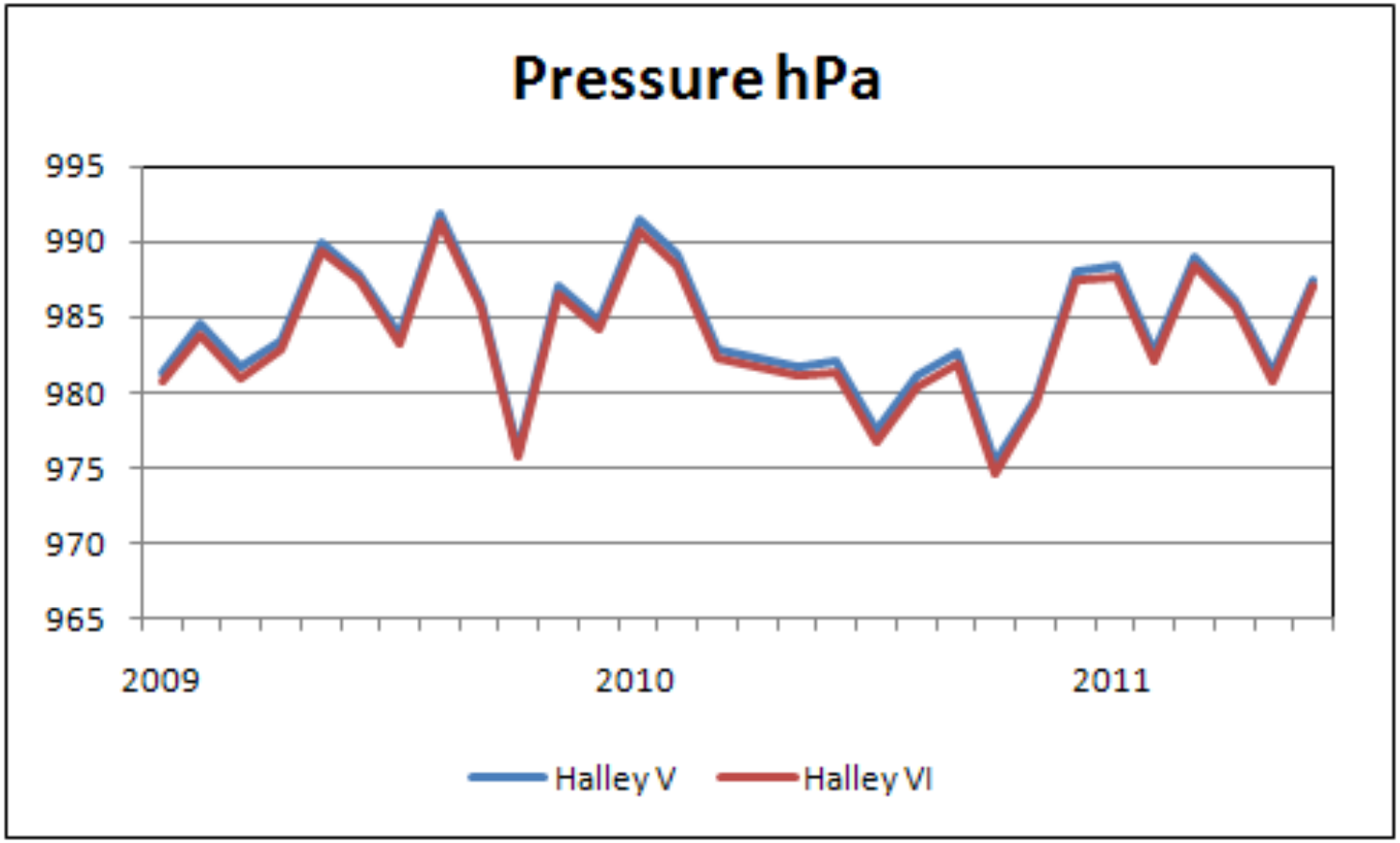

British
Antarctic Survey

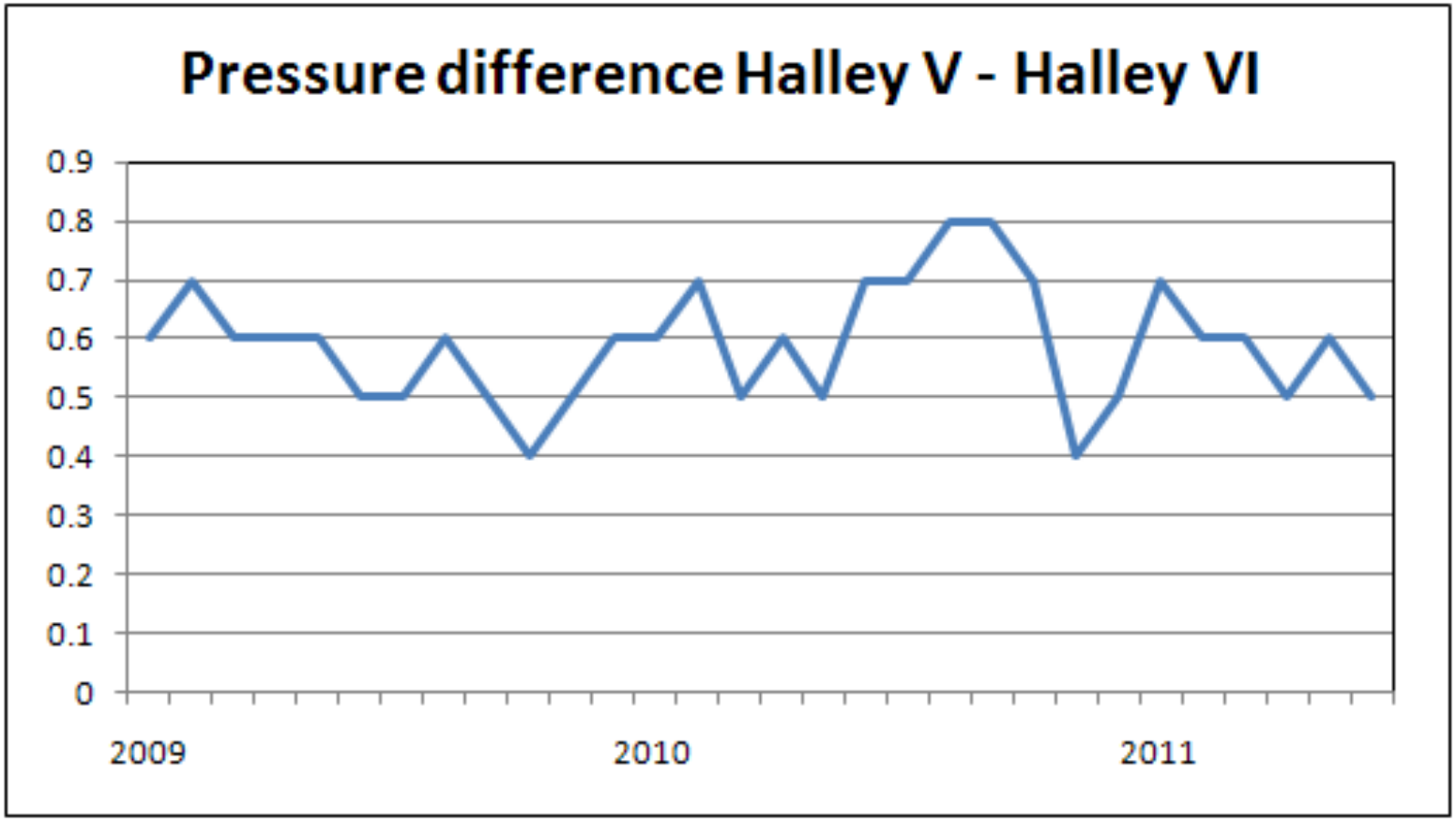

Temperature °C
0
-5
-10
-15
-20
-25
-30
-35
2009
2010
2011
Halley V
Halley VI

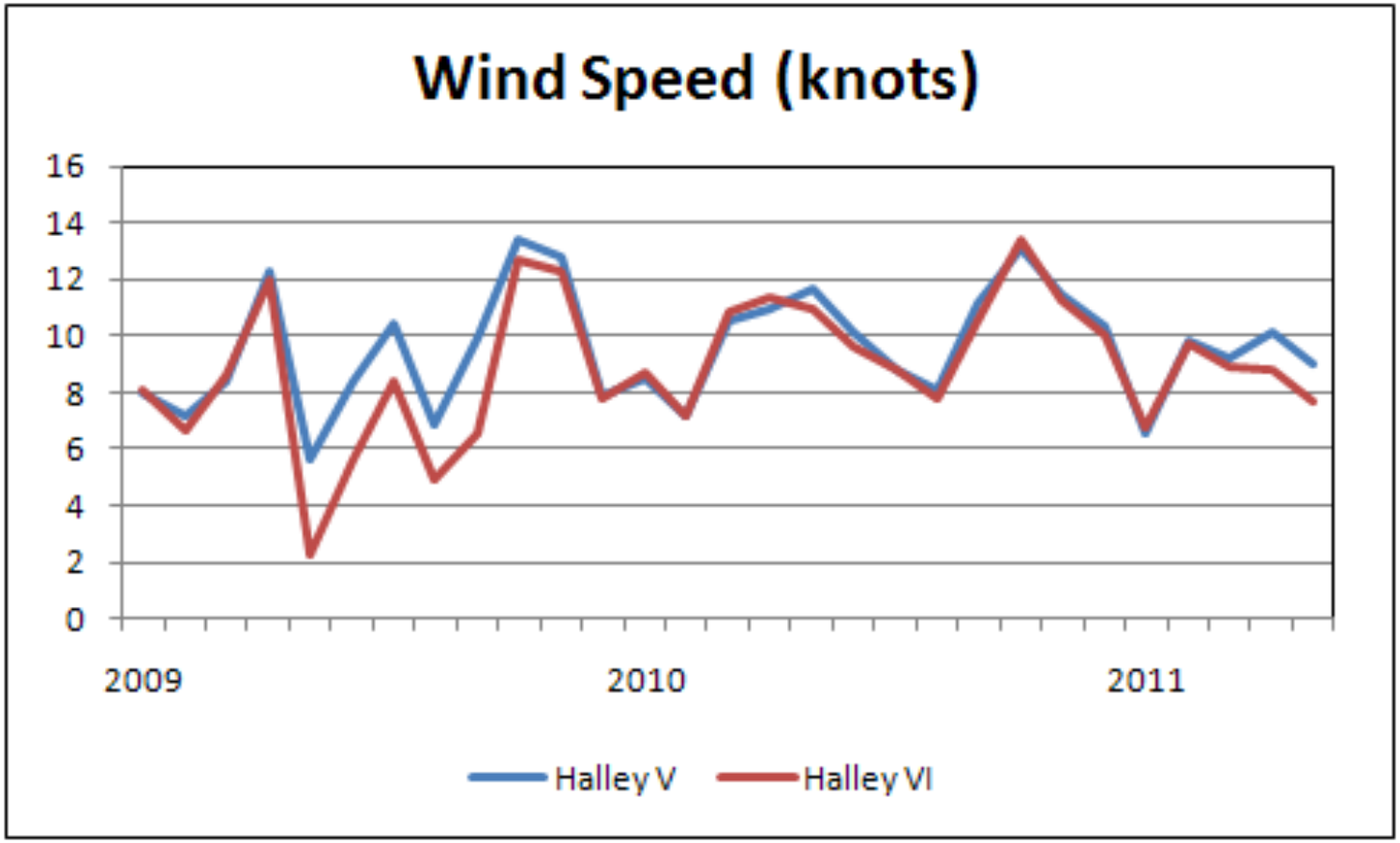

Temperature difference Halley V - Halley VI
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
2009
2010
2011

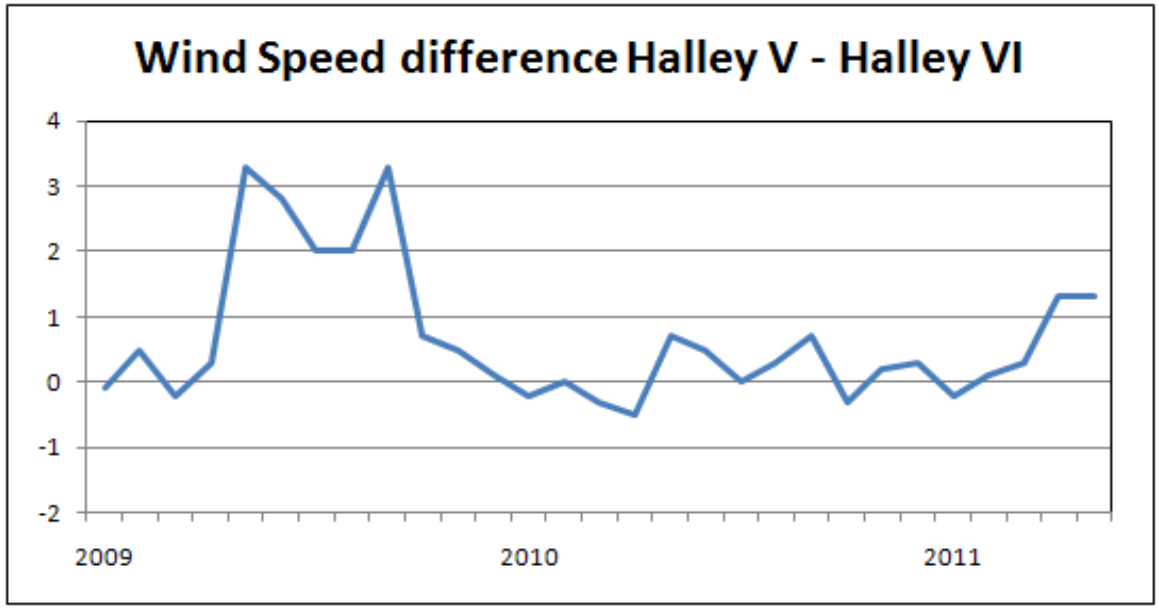

Relative Humidity %
95
90
85
80
75
70
2009
2010
2011
Halley V
Halley VI

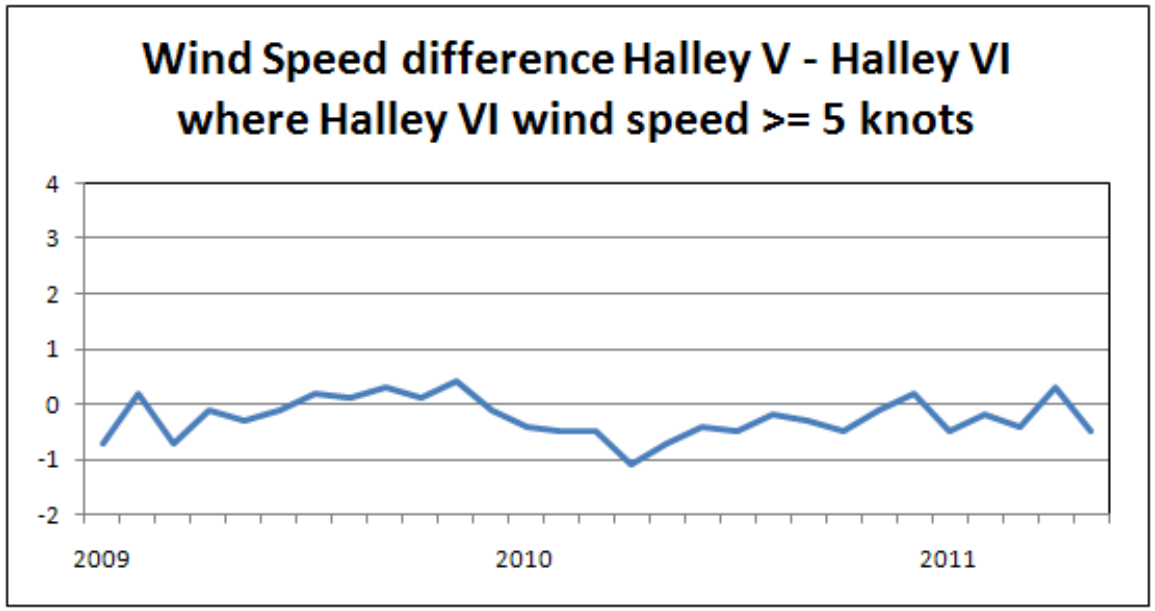

Humidity difference Halley V - Halley VI
0.5
0
-0.5
-1
-1.5
-2
2009
2010
2011


Pressure hPa
995
990
985
980
975
970
965
2009
2010
2011
Halley V
Halley VI


Pressure difference Halley V - Halley VI
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2009
2010
2011


Wind Speed (knots)
16
14
12
10
8
6
4
2
0
2009
2010
2011
Halley V
Halley VI


Wind Speed difference Halley V - Halley VI
4
3
2
1
0
-1
-2
2009
2010
2011


Wind Speed difference Halley V - Halley VI
where Halley VI wind speed >= 5 knots
4
3
2
1
0
-1
-2
2009
2010
2011

JAWS (Just Another Weather Station)

- Based around a Campbell CR1000 logger.
- Druck pressure sensor.
- Temperature is obtained via a PRT in an aspirated radiation shield.
- Humidity is obtained from a Vaisala HMP 45 probe also in an aspirated radiation shield.

- There are two wind sensors, a Vaisala WS 425 sonic anemometer is the primary source of the wind data but there is also an RM young aerovane as a backup .
- A CNR1 solar radiation sensor is attached to the system that can measure incoming and outgoing long and shortwave radiation.
- Sunshine is recorded using a CSD1 sunshine detector attached.

- Daily radiosonde lauches using a Vaisala MW31 ground station, RS92 radio-sondes and 350gram balloons.
- Vaisala cloudbase recorder.
- 2 Biral LPS (Laser Precipitation Sensor)
  - Uses an infra-red laser to measure water droplets and snow that pass between its sensor heads, it measures the reduction in the received signal and the length of time of the reduction and from this it can calculate the diameter of the particle and the fall speed

- Atmosphere aerosol will be measured using a Prede POM-01 sun photometer.
- Ozone will measured using a Dobson spectrophotometer.
- Air samples will be collected for NOAA.
- Snow samples will be collected and sent back to Vienna to be sampled for radioactive isotopes.


Questions