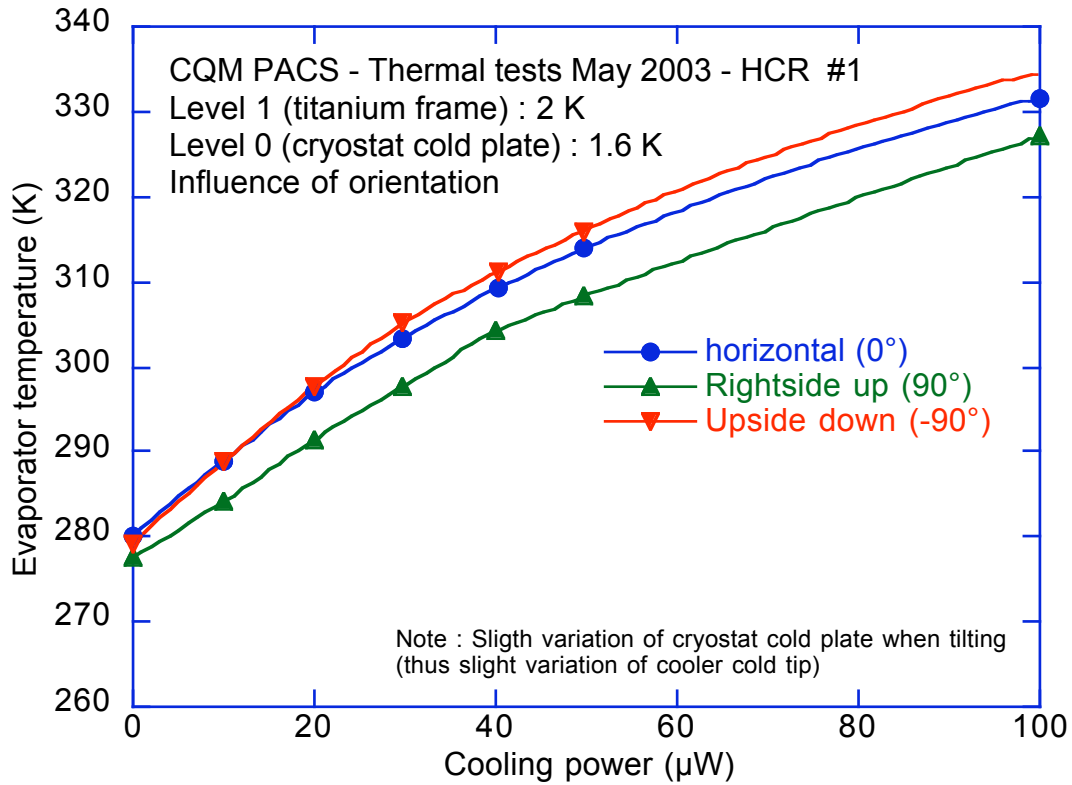
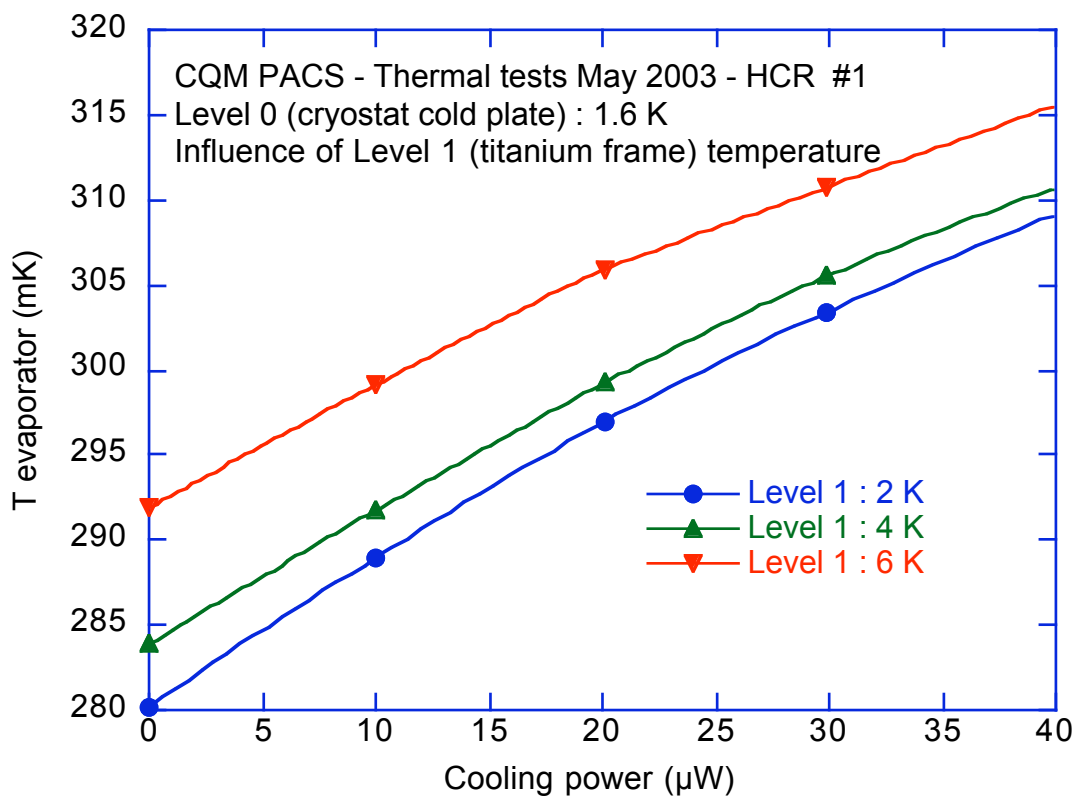


PACS CQM COOLER
HEALTH CHECK REPORT #1 - SUMMARY OF RESULTS
(this document will eventually become a project note, when I have time)

Performance versus orientation



Impact of level 1 temperature



The difference between the three curves is due to the additional load from the Kevlar cords. This contribution can be easily extracted from the curves (done for 280 mK):

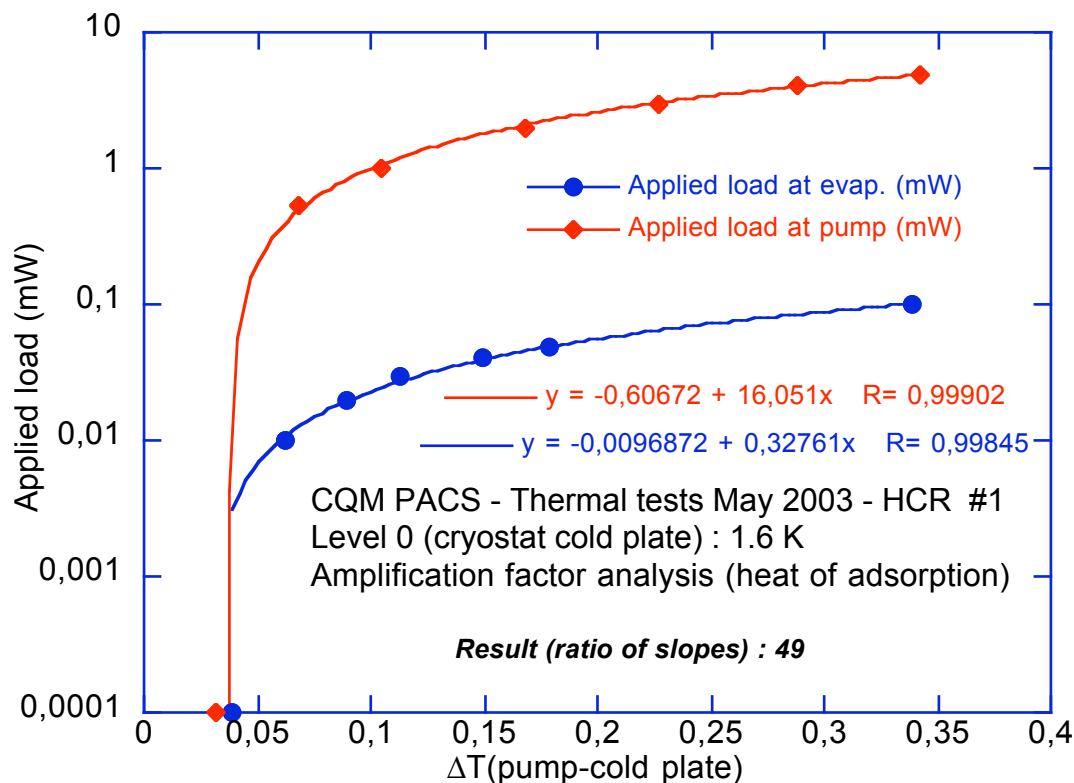
Additional load from Kevlar	Extracted from experimental data	Calculated from model
[2 – 4]	4.5 μ W	3.4 μ W
[2 – 6]	10.7 μ W	10.7 μ W
[4 – 6]	6.2 μ W	7.4 μ W

Parasitics

The analysis of the data using various techniques (heat of adsorption, cooling power curve, etc...) leads to a parasitic load of about 12 μ W +/- 10% (1.62 K level 0 – 2 K level 1) (model predicts \approx 10 μ W).

Heat of adsorption

Whenever helium gets adsorbed, heat is released (exothermic process – loss of degree of freedom). So basically there is an amplification factor between the load at the evaporator and the resulting load at the pump. This factor is usually between 45 and 50 ; we have performed again the measurement and found it to be in the range 46 to 49. An example of analysis is displayed in the following curve.



From these curves the parasitic load can also be extracted ; the analysis leads to :

Evaporator curve : 9.7 μ W

Pump curve : 12.4 μ W

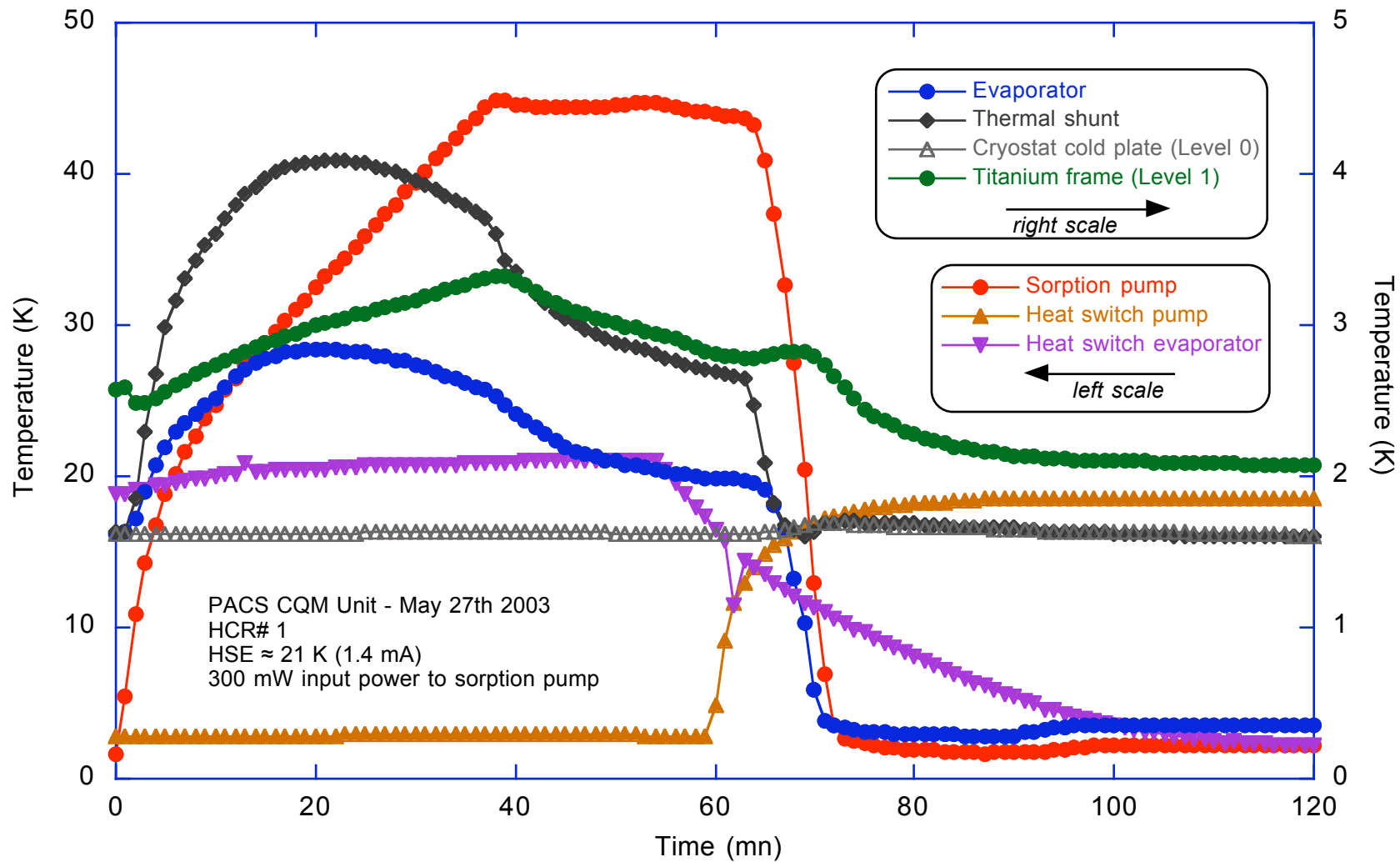
Hold time

One test is carried out : hold time under 200 μ W load.(the nominal 48 hours test is performed at HCR #3 – see AIV plan). The result is a bit unexpected : 5.5 hours against 6.5 predicted.

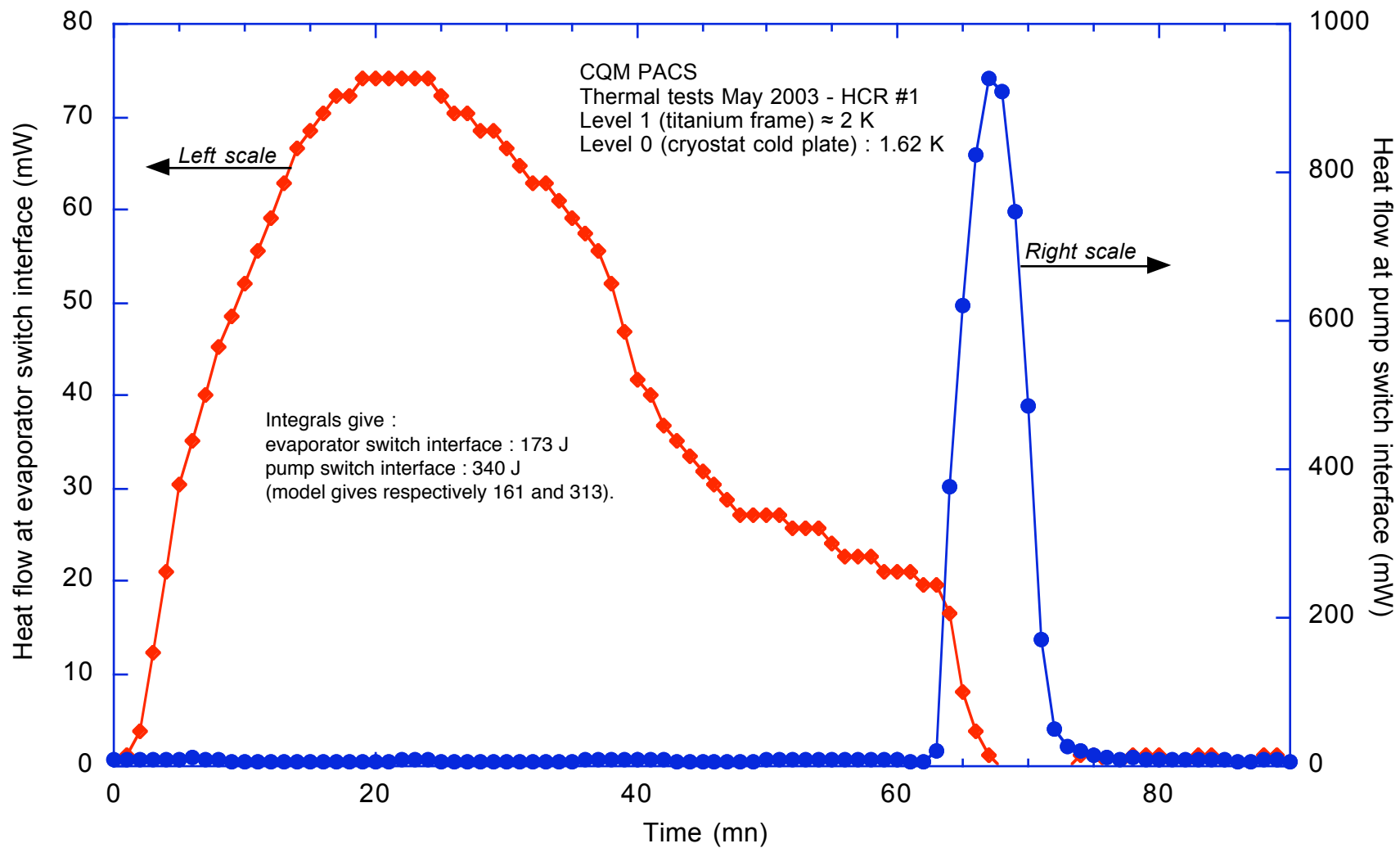
This is one test. Under investigation (Tests with SPIRE CQM will permit to discriminate between various causes).

Cooler Recycling

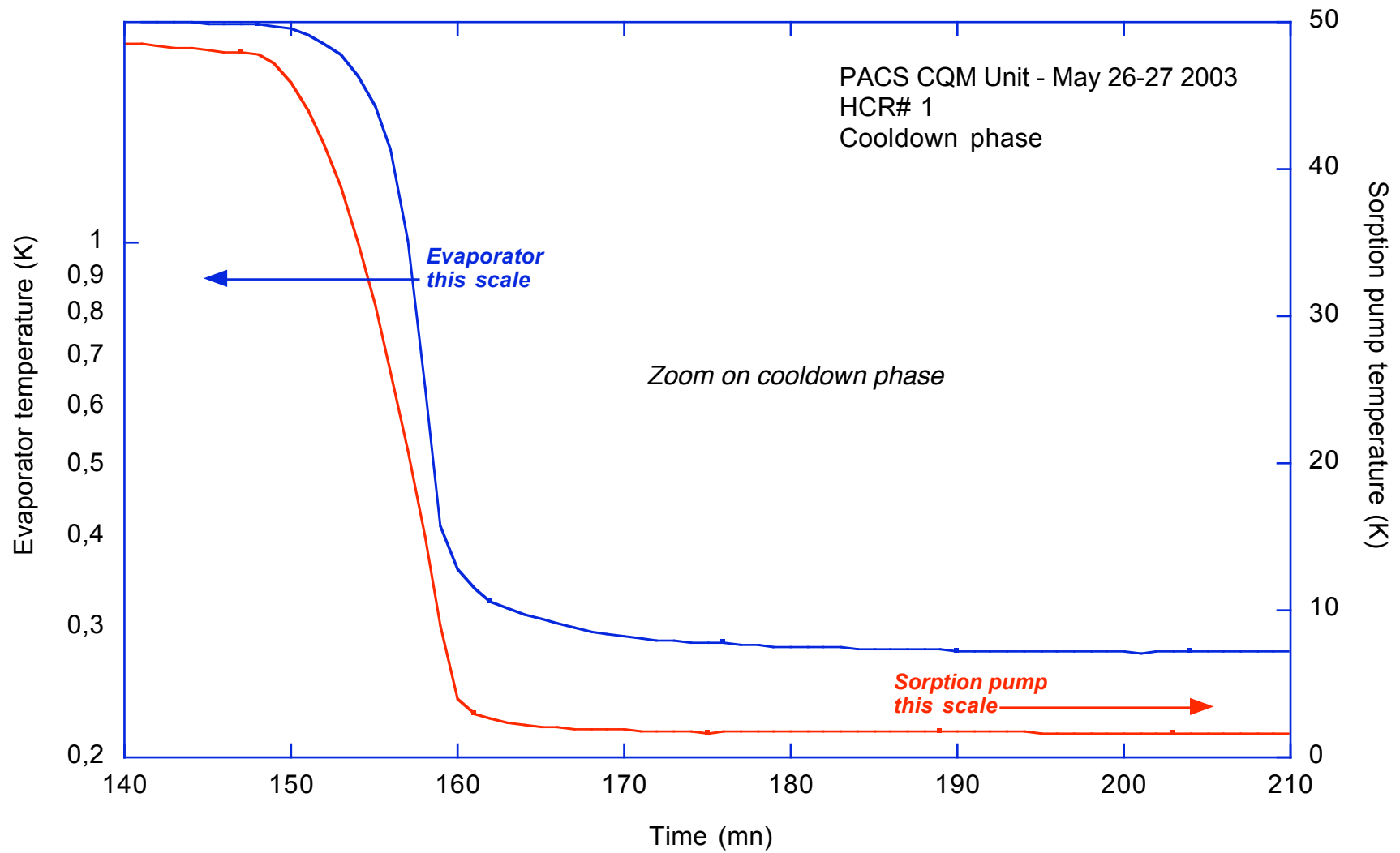
temperature profile



Power profile



Cooldown phase - zoom



Long term temperature stability

