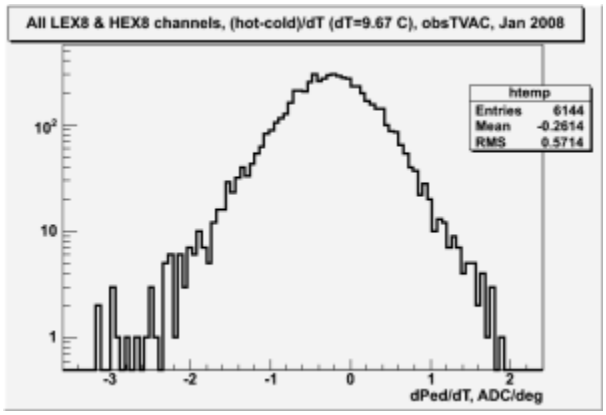
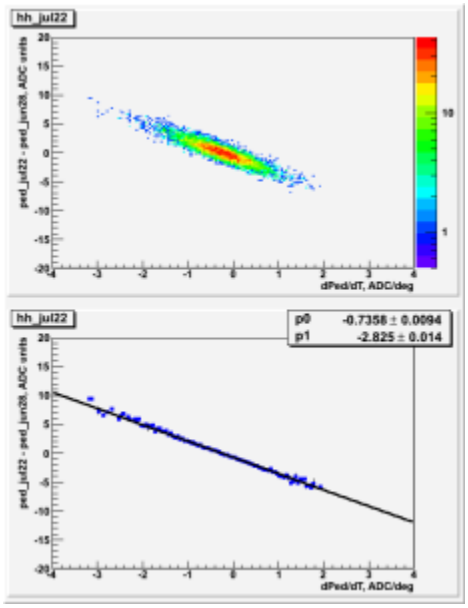
Drift of calorimeter pedestals with time

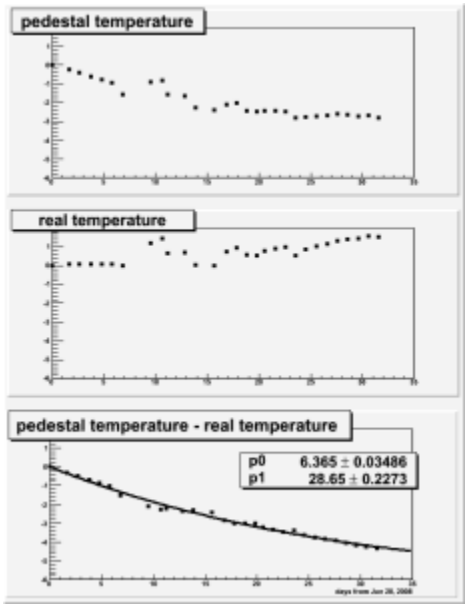
I've calibrated the drift of CAL pedestals with temperature using ground muon runs collected at cold and hot thermal balance periods of Observatory TVAC (NRL, Jan 2008).
The histogram of the coefficients of pedestal drift with temperature for all LEX8 and HEX8 channels is shown on the following plot:



If for some run we plot for each LEX8 and HEX8 channel the pedestal drift with respect to June 28 versus temperature coefficient for the same channel, we get the linear correlation with the slope equal to the temperature during this run - see the plot below for July 22:



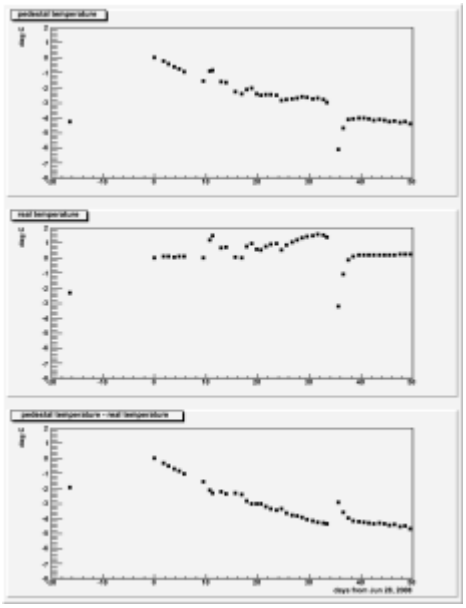
By applying the same procedure to the set of 29 runs from the period June 28 - July 30 (~1 run per day), one can obtain the evolution of pedestal temperature vs day from June 28 (top plot):



On the bottom plot the real CAL temperature (average of all AFEE board temperature for the whole run) was subtracted from "pedestal temperature", showing the effect of pedestal drift NOT related to temperature variation.
This drift is negative and initially had the rate equivalent to the temperature drift ~1 deg ped week. After 3 weeks the slope is clearly decreasing and the behaviour now is close to exponential approaching some stable value - according to the fit with function y = p0*(exp(-t/p1)-1), the parameters are: p0 = 6.2 deg (stable pedestal temperature), p1 = 28 days (time constant). This is a good news - if the drift will stop, it will greatly simplify the CAL calibration. But it is not excluded that drift will just arrive to different constant rate.

I'll continue to monitor this non-thermal pedestal drift.

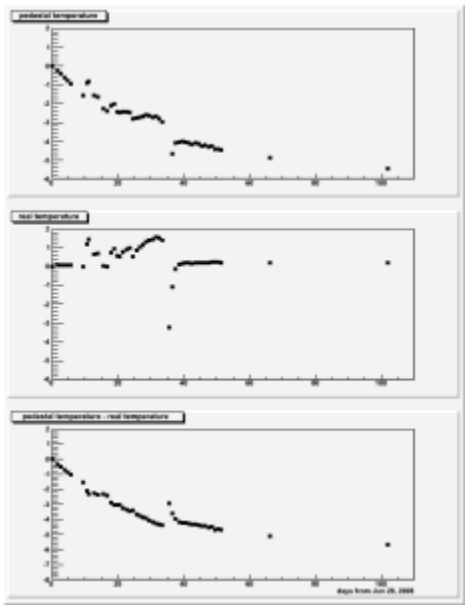
The following plot shows the non-thermal pedestal drift for 50 days since Jun 28. It also shows the pedestal and real temeperatures for cold therma balance of Observatory TVAC (this measurement was done on January 20, but on the plot it was shown at launch date Jun 11).

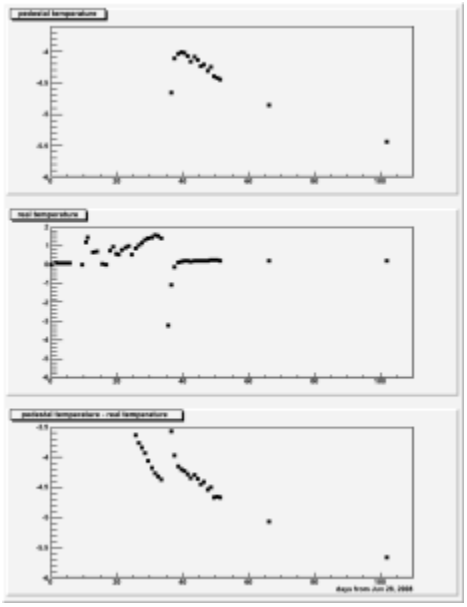


The plot shows that the difference between pedestal temperature and real temperature has deviations from pure exponential behaviour, when temperature was significantly different from nominal (LAT power OFF). The prelaunch point looks very different from orbit behaviour - the reason is not clear.

I plan to add more pre-launch measurements on this plot.

Two next plots show the non-thermal pedestal trend over 103 days in normal and zoomed vertical scale.





The slow decrease of pedestal temperature while real temperature is constant continues at the rate ~0.5 degree/ month - this corresponds to the pedestal drift of 1.5 ADC units per month in the most sensitive channels.