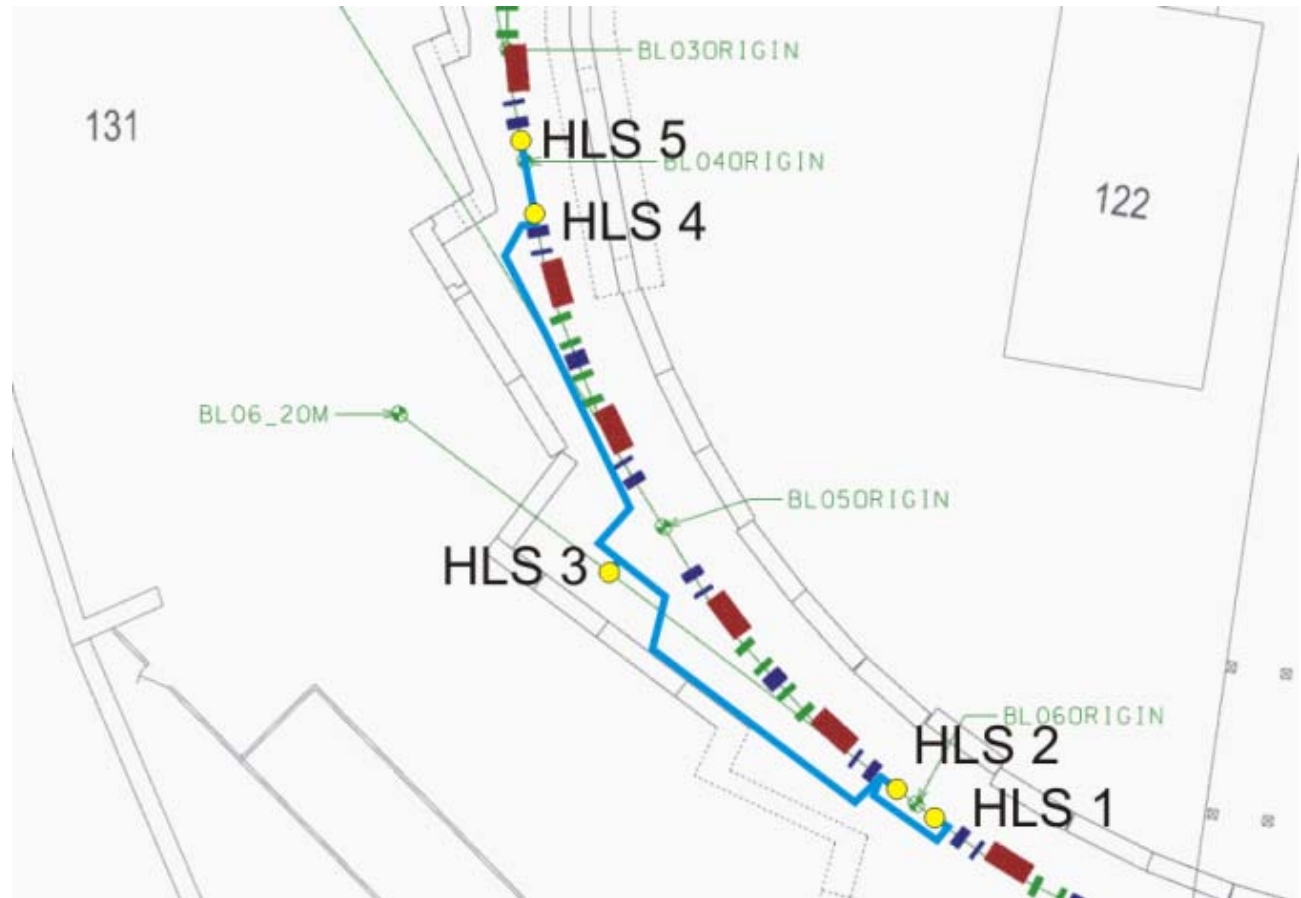# HLS vs. Temperature Correlations in SPEAR3

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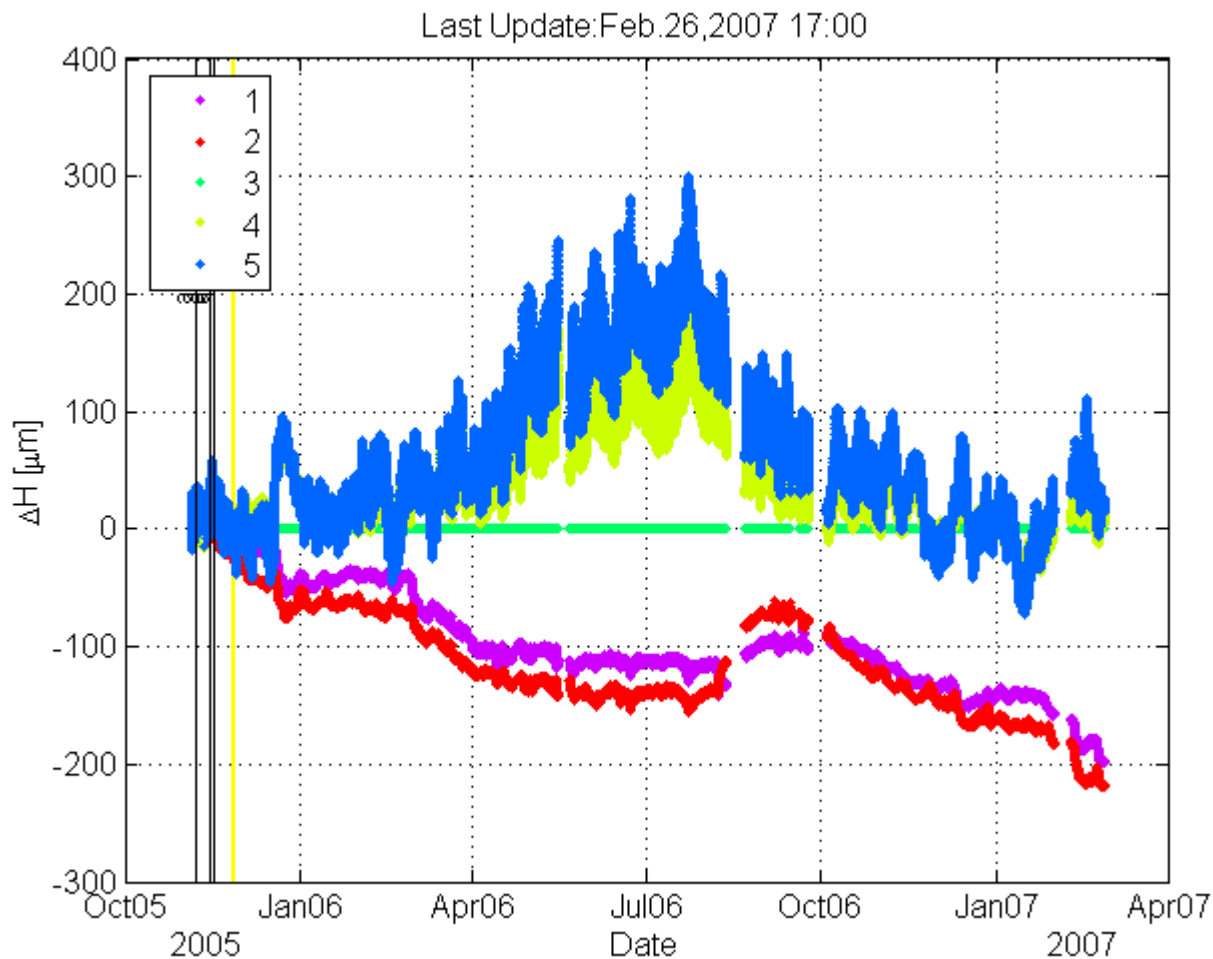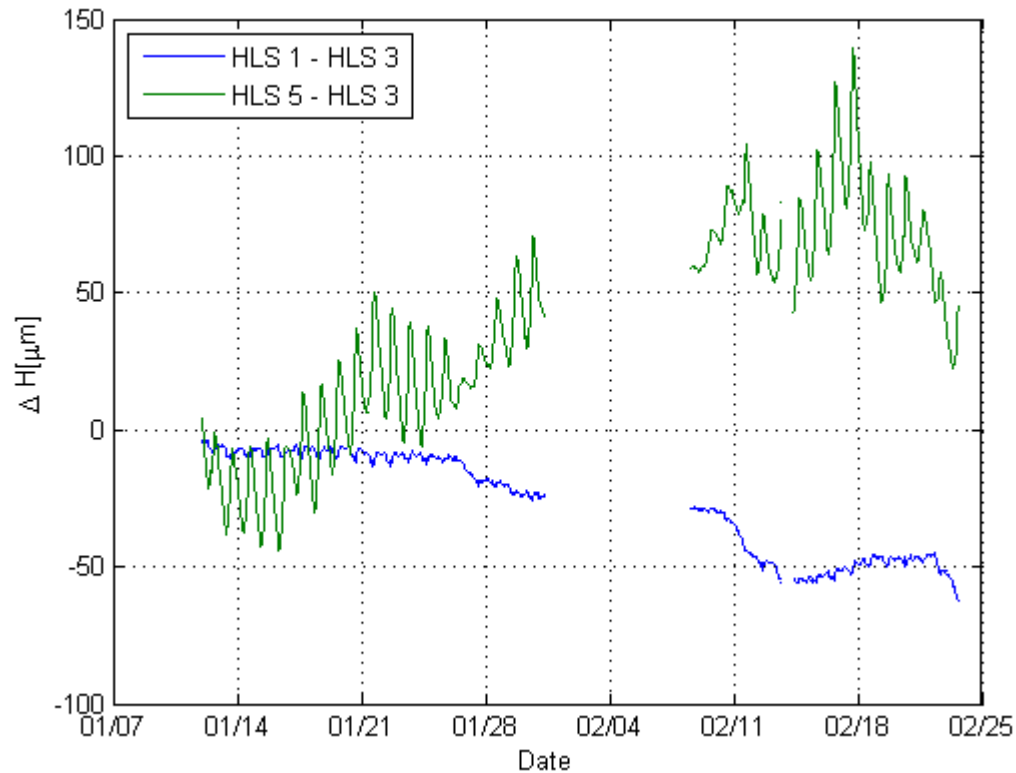
HLS results (1)
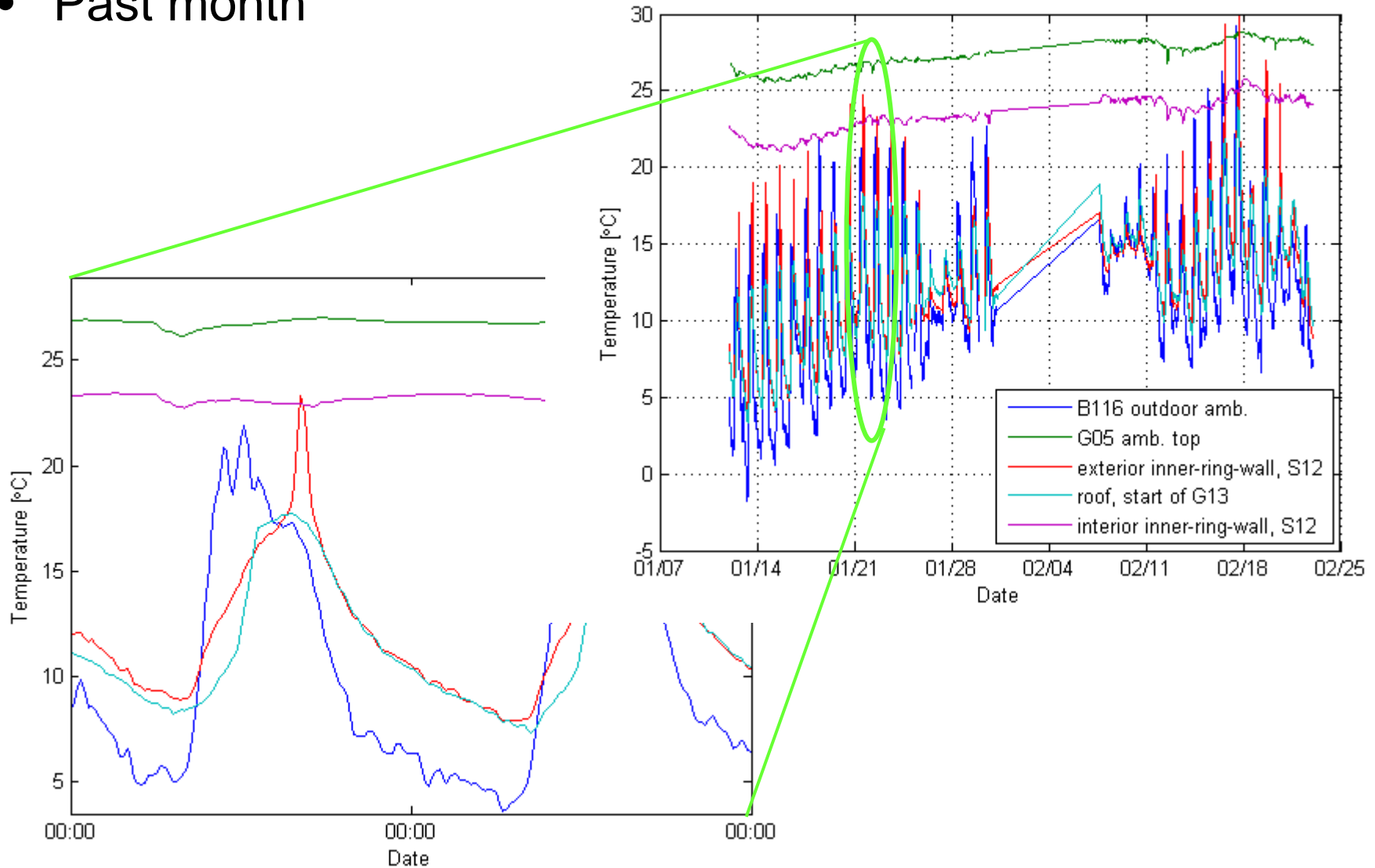
- One year of data

HLS results (2)

- Past month

Temperature measurements – SPEAR3 sensors

- Past month

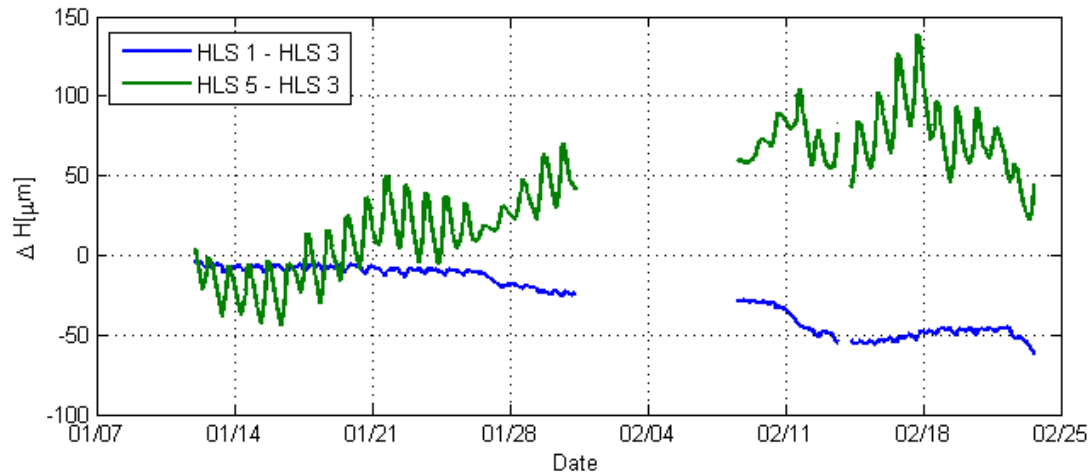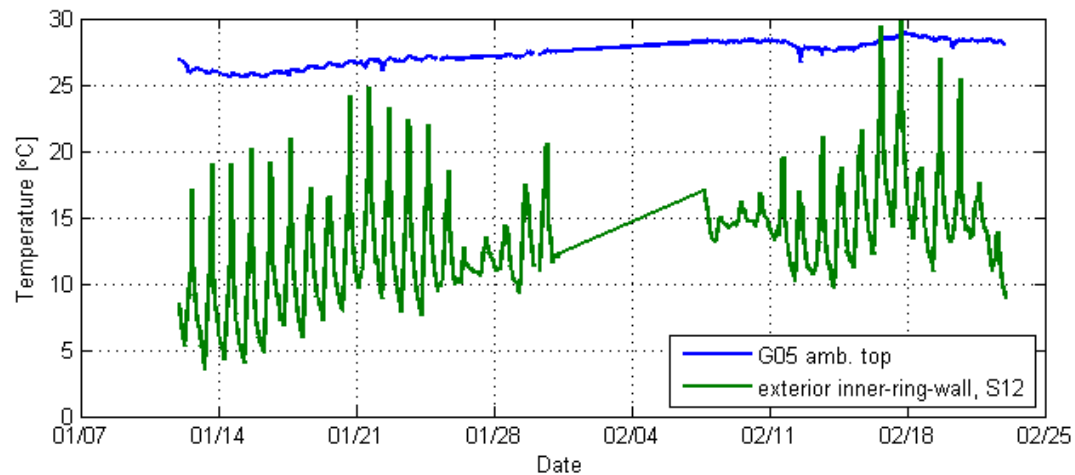- Past month

Temperature measurements vs. HLS readings

- Past month

HLS Sensor Readings

Temperature Sensor Readings

Correlations of Temperature Vs. Sensor Readings

- Correlation between external temperature and floor movement is >>
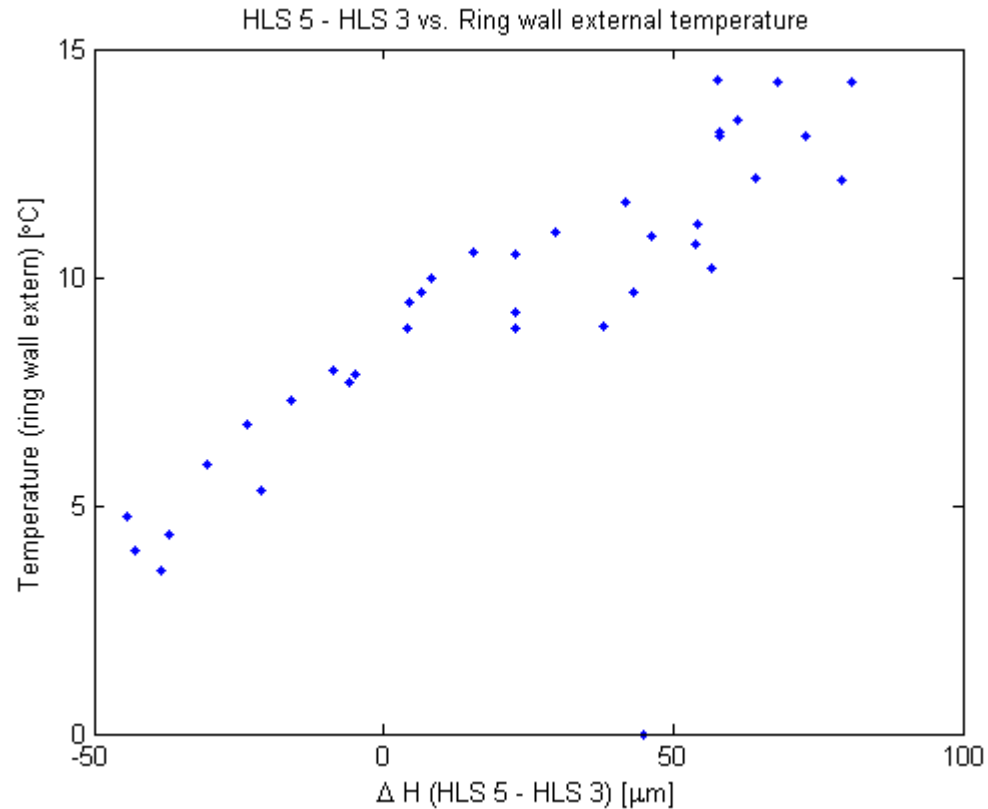- Correlation between tunnel temperature and floor movement is <<

	HLS1-HLS3	HLS5-HLS3	B116	G05 intern	Ring wall extern	Roof	Ring wall Intern
HLS1-HLS3	1.00	-0.82	-0.58	0.03	-0.46	-0.46	-0.02
HLS5-HLS3	-0.82	1.00	0.88	0.09	0.78	0.76	0.16

- Correlation between sensor temperature and floor movement is >>

	HLS1-HLS3	HLS5-HLS3	Temp HLS1	Temp HLS2	Temp HLS3	Temp HLS4	Temp HLS5
HLS1-HLS3	1.00	0.82	0.73	0.72	0.68	0.80	0.77
HLS5-HLS3	-0.82	1.00	0.93	0.93	0.88	0.92	0.96

Example for Correlation

- Example for correlation

Correlations of Daily Changes

- Correlation between external temperature variations and floor movement variation
- Correlation between tunnel temperature variations and floor movement

|	HLS1-HLS3	HLS5-HLS3	B116	G05 intern	Ring wall extern	Roof	Ring wall Intern
HLS1-HLS3	1.00	0.27	0.56	0.53	0.59	0.64	0.48
HLS5-HLS3	0.27	1.00	0.78	0.80	0.74	0.53	0.73

- Correlation between sensor temperature variations and floor movement var. is <<

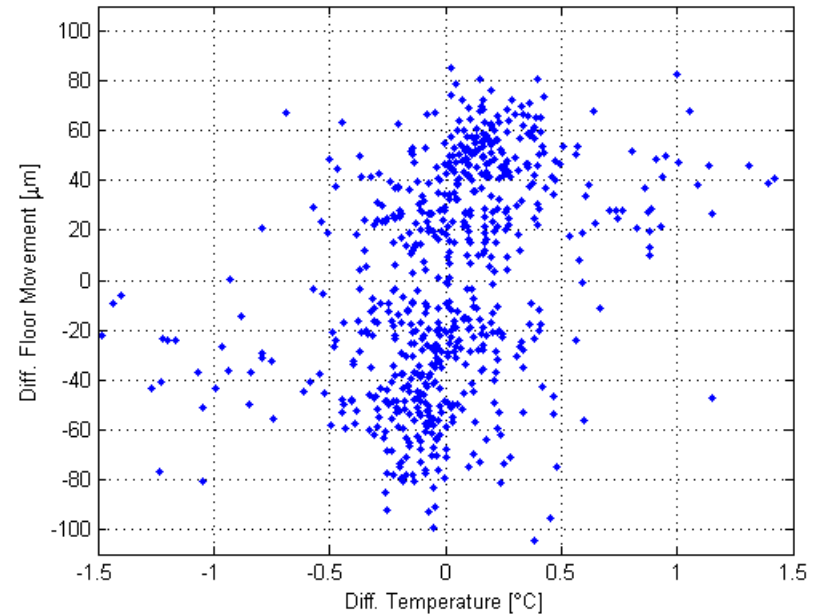|	HLS1-HLS3	HLS5-HLS3	Temp HLS1	Temp HLS2	Temp HLS3	Temp HLS4	Temp HLS5
HLS1-HLS3	1.00	0.27	0.24	-0.52	-0.19	-0.20	-0.51
HLS5-HLS3	0.27	1.00	0.59	0.25	0.34	0.31	-0.22

Results for one year of Data

Correlation between temperature in Bldg 116 and floor movement

Corrcoef.: 0.87
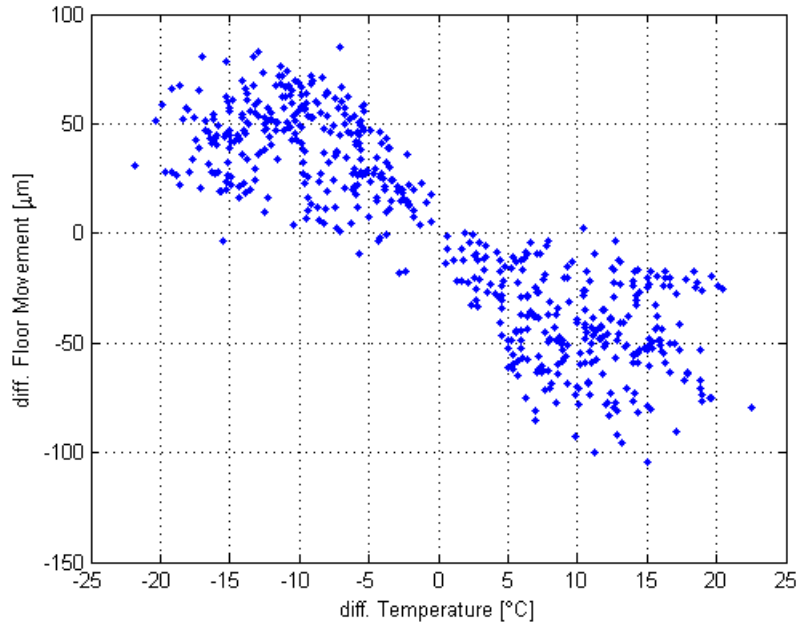
Correlation between temperature in Tunnel (G05 intern) and floor movement

Corrcoef.: 0.2

Summary

- The data suggest that long term movement is correlated to the HLS sensor temperature -> Temperature of the tunnel floor

- The one year data analysis suggests that the external temperature is the main factor for short term floor movement not the internal temperature of the tunnel. Even though this months data does not exclude the internal temperature of the tunnel as the source for daily floor movement.