Summary of 21st ILRW, Clinics Session 3
System accuracy/biases

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In this Clinics session we visited some practical issues that may affect the accuracy of SLR measurements, presenting and distributing analysis results that can be useful for performance evaluation and system diagnosis.

Attendees were first given a brief reminder of the potential problems arising from operating at inconsistent return rates. Optical intensity effects are unavoidable with spherical geodetic satellites; good calibration practices and, at the very minimum, setting some high return rate limit is recommended. Station personnel were asked to question whether their hardware and operational practices can be truly expected to cope with the huge dynamic range of intensities obtained for observations taken at different zenith angles and atmospheric conditions, from satellites orbiting at vastly different altitudes. It must be noted that considering only atmospheric effects and satellite elevation over the horizon, the intensity of returns can vary by up to 4 orders of magnitude.

In the second and main part of this Clinics session, aggregated orbital analysis residual plots were presented, and their usefulness for station diagnosis discussed. Plots of post-fit observation residuals aggregated according to several variables of interest contain information about possible issues at the station level related to those variables. In principle, there should not be any distinguishing features in the distribution of observation residuals. The presence of any trend or departure from normality indicates either a modelling deficiency or a genuine problem with the data. Various items related to operational practices can be revealed by analysis of these plots, e.g. intensity dependence, day and night differences, calibration problems, and data reduction issues. Examples of these plots were examined, after which attendees representing stations of the network were given printed copies for further study. These plots are available for download from the NESC forum.

As a conclusion, the general recommendation for stations is to monitor their data from as many points of view as possible, e.g. with the aid of the residual plots presented here, system delay time series, etc. Testing, discussion and investigation should follow if any sort of anomalies or trends are detected, in order to identify the cause and eliminate/minimise it if appropriate. Above all, stations are requested to maximise the *stability* of their observations.