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NLS GNSS SOFAMESA

GNSS Measurement Accuracy Analysis Software of the National Land Survey of Finland
Beta Version 1.10
2019-05-27

Measurement Report of the File:

20190524-A-99M5040-METHOD1-4

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Thank you for the help: Topi Rikkinen, Marko Ollikainen, Antti Laaksonen, Hannu Koivula, and Ari Huvinen.

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Statistics Behind the Figures

Parameter	Value
Total Number of Measurements	12320.0
Number of All Satellites Mean (No Outliers or Float Solutions Removed)	25.3
Number of All Satellites Min and Max (No Outliers or Float Solutions Removed)	Min: 11 and Max: 34
Number of GPS Satellites Mean (No Outliers or Float Solutions Removed)	9.7
Number of GLONASS Satellites Mean (No Outliers or Float Solutions Removed)	5.6
Number of GALILEO Satellites Mean (No Outliers or Float Solutions Removed)	5.5
Number of BEIDOU Satellites Mean (No Outliers or Float Solutions Removed)	4.5
Mean of HDOP Values (No Outliers or Float Solutions Removed)	0.6
Mean of VDOP Values (No Outliers or Float Solutions Removed)	1.1
Mean of PDOP Values (No Outliers or Float Solutions Removed)	1.3
Mean of TDOP Values (No Outliers or Float Solutions Removed)	nan
Mean of GDOP Values (No Outliers or Float Solutions Removed)	1.4
User-Defined Tolerance Values	North and East 0.1m, Height 0.2m
Number of Measurements Above the Set Tolerance Values	107
Above Tolerance Values Percentage	0.87%
Number of All Satellites Mean (Outliers Removed)	25.3
Number of Satellites Min and Max (Outliers Removed)	Min: 11 and Max: 31
Number of GPS Satellites Mean (Outliers Removed)	9.7
Number of GLONASS Satellites Mean (Outliers Removed)	5.6
Number of GALILEO Satellites Mean (Outliers Removed)	5.5
Number of BEIDOU Satellites Mean (Outliers Removed)	4.5
Mean of HDOP Values (Outliers Removed)	0.6
Mean of VDOP Values (Outliers Removed)	1.1
Mean of PDOP Values (Outliers Removed)	1.3
Mean of TDOP Values (Outliers Removed)	nan
Mean of GDOP Values (Outliers Removed)	1.4

Parameter	Precision (m)*	Accuracy (m)**
Horizontal RMSE* **	0.013	0.013
Vertical RMSE** **	0.026	0.028
Horizontal 2dRMSE* **	0.026	0.026
Vertical 2dRMSE** **	0.053	0.056
North Coordinate Standard Deviation	0.0094	
East Coordinate Standard Deviation	0.0093	
Height Standard Deviation	0.0264	
North Coordinate Mean	6687768.3916	
East Coordinate Mean	394444.8156	
Height Mean	25.1207	
North Coordinate Median	6687768.392	
East Coordinate Median	394444.815	
Height Median	25.12	

* The precision of the measurements = inner accuracy.

** The accuracy of the measurements = outer accuracy.

*** Horizontal RMSE is 63-68% of the measurements and it depends on the shape of the distribution. Horizontal 2dRMSE is 95-98% of the measurements and it also depends on the shape of the distribution.

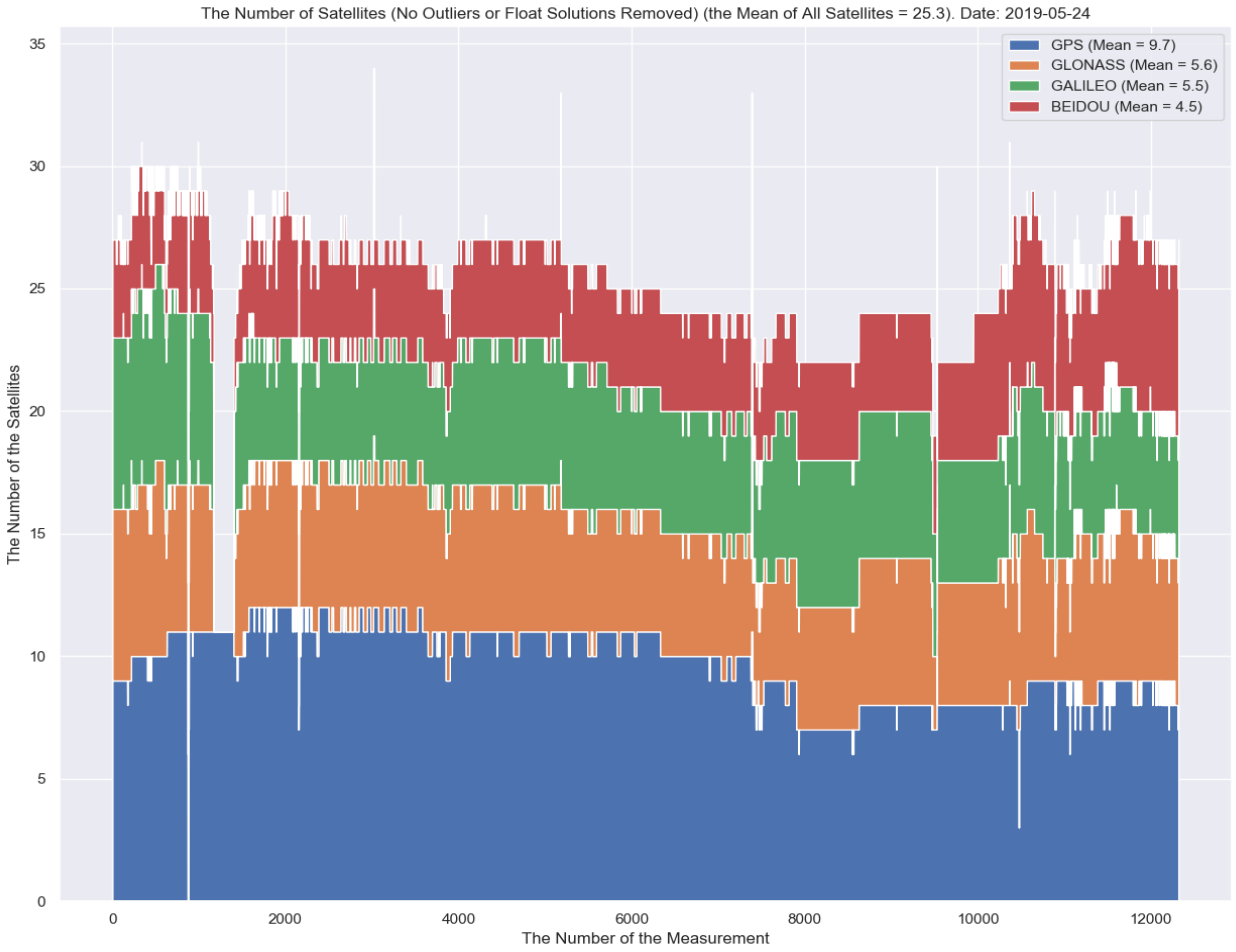
**** Vertical RMSE is 63-68% of the measurements and it depends on the shape of the distribution. Vertical 2dRMSE is 95-98% of the measurements and it also depends on the shape of the distribution.

Figures

Please find the figures, which NLS GNSS SOFAMESA produces, on the upcoming pages.

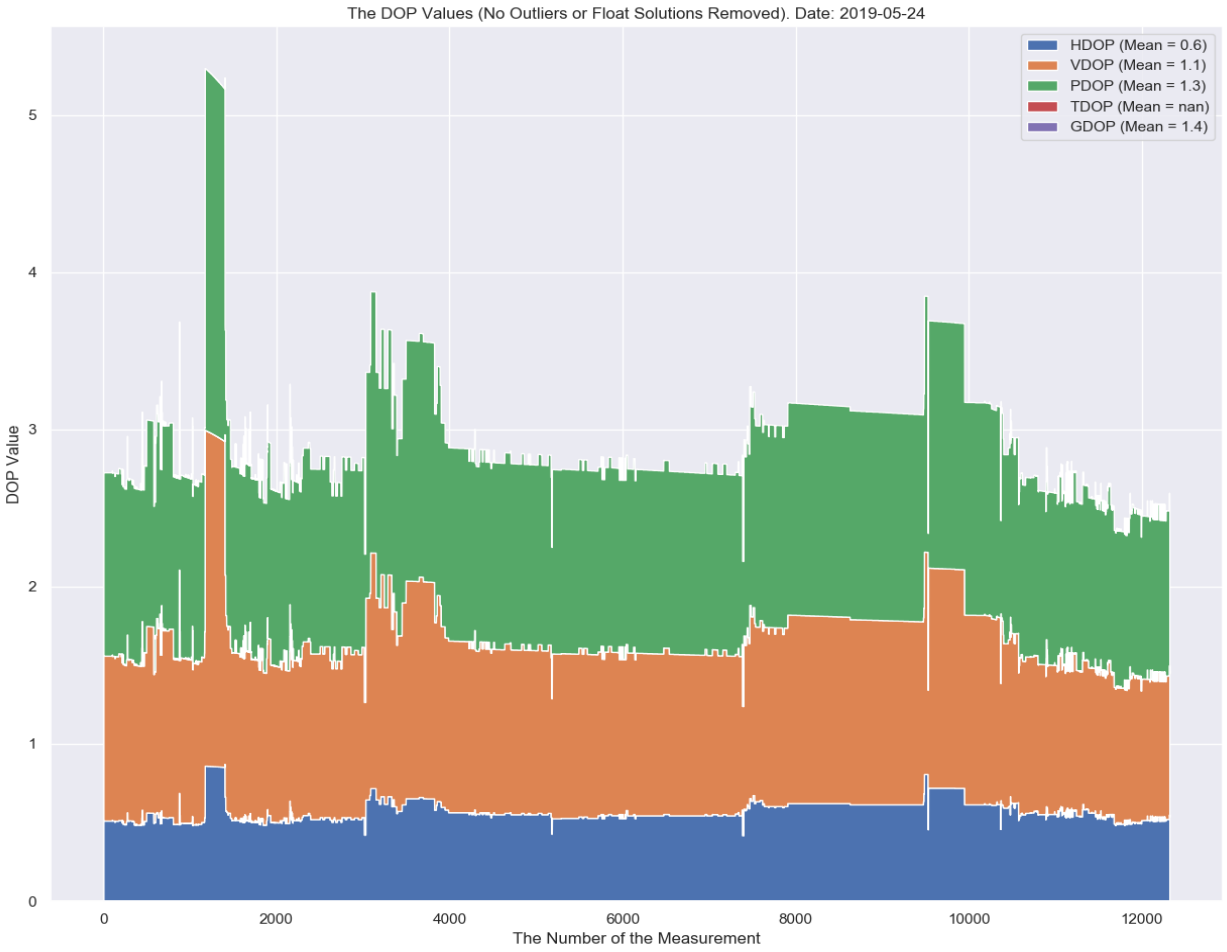
The Number of Satellites (No Outliers or Float Solutions Removed)

METHOD1



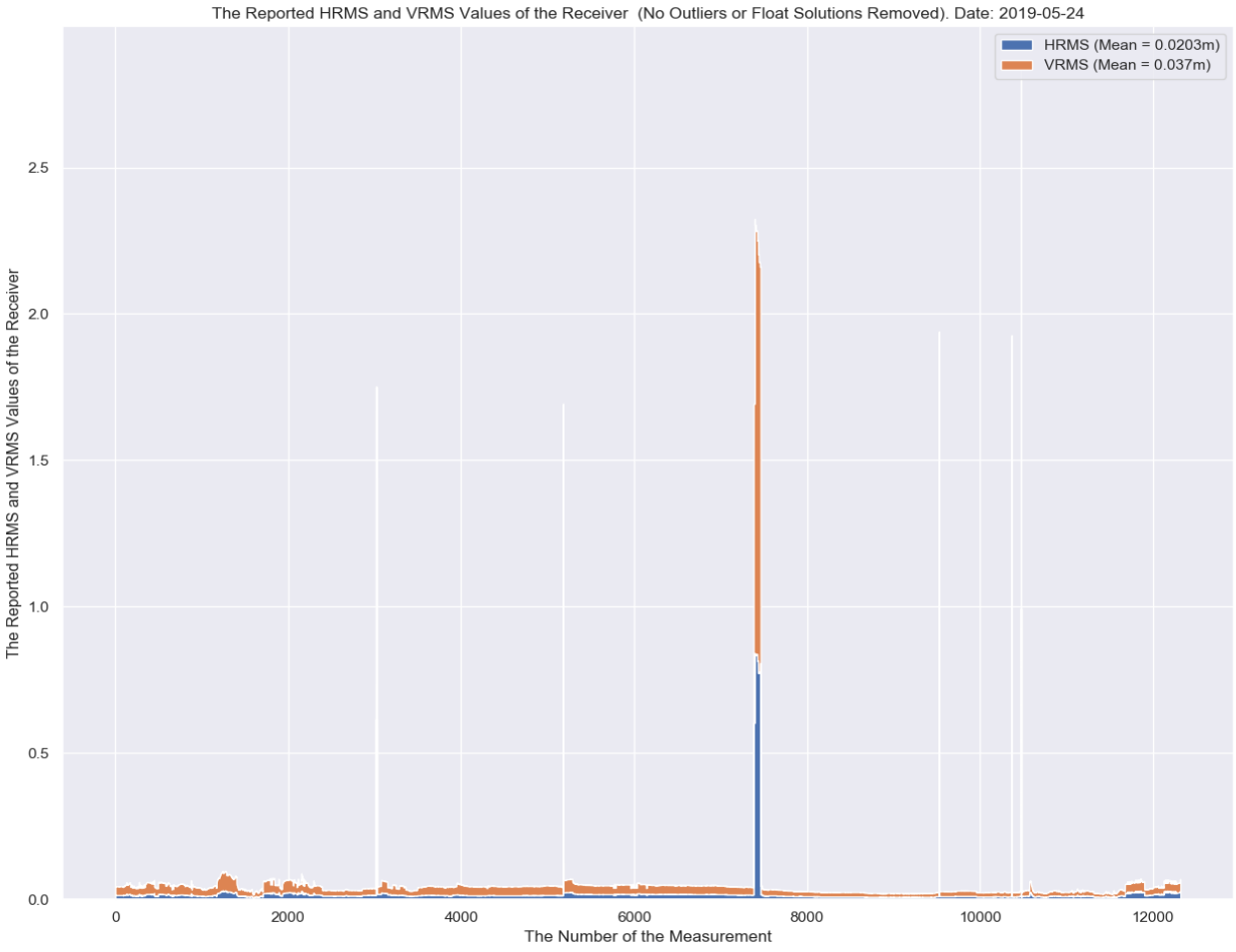
The DOP Values (No Outliers or Float Solutions Removed)

METHOD1



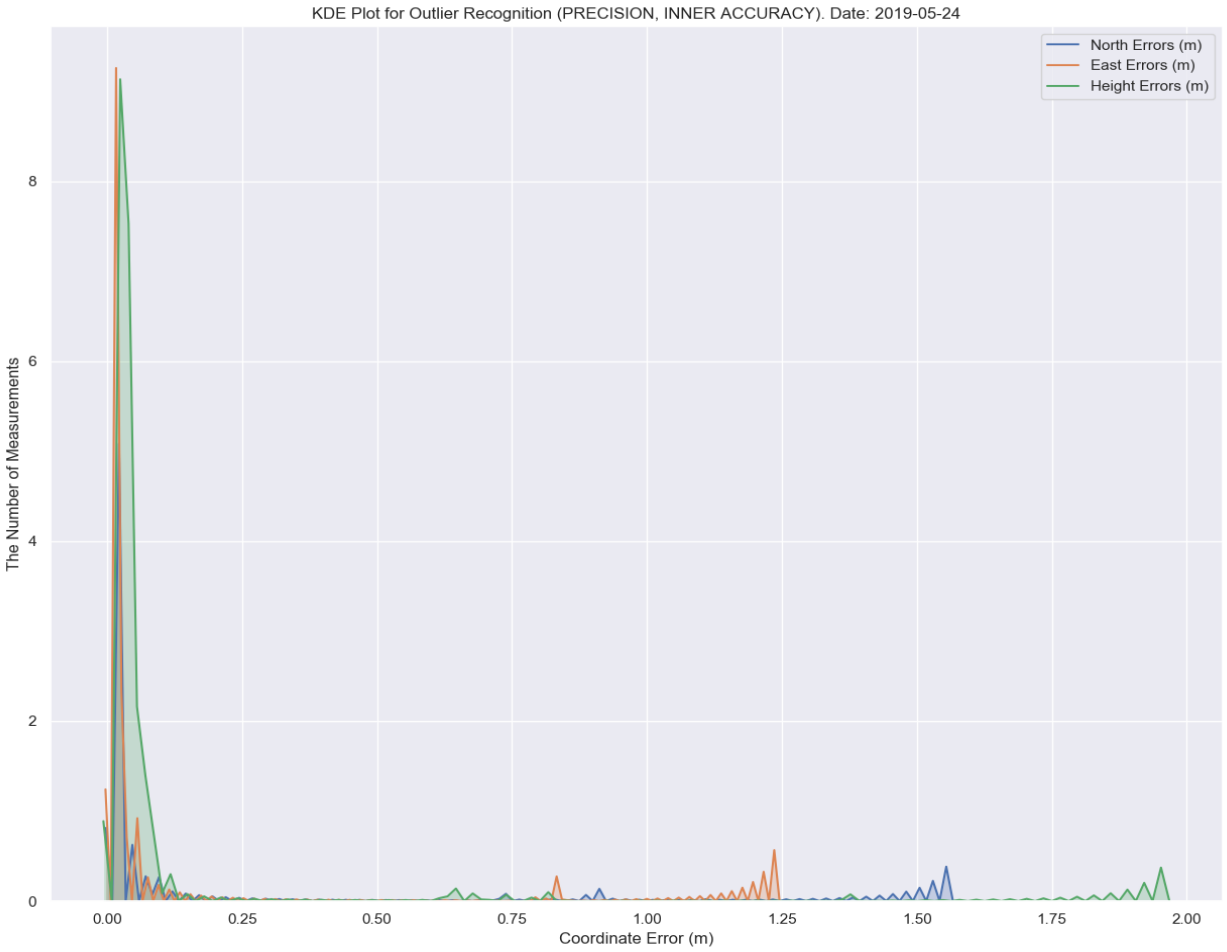
The Reported HRMS and VRMS Values of the Receiver (No Outliers or Float Solutions Removed)

METHOD1



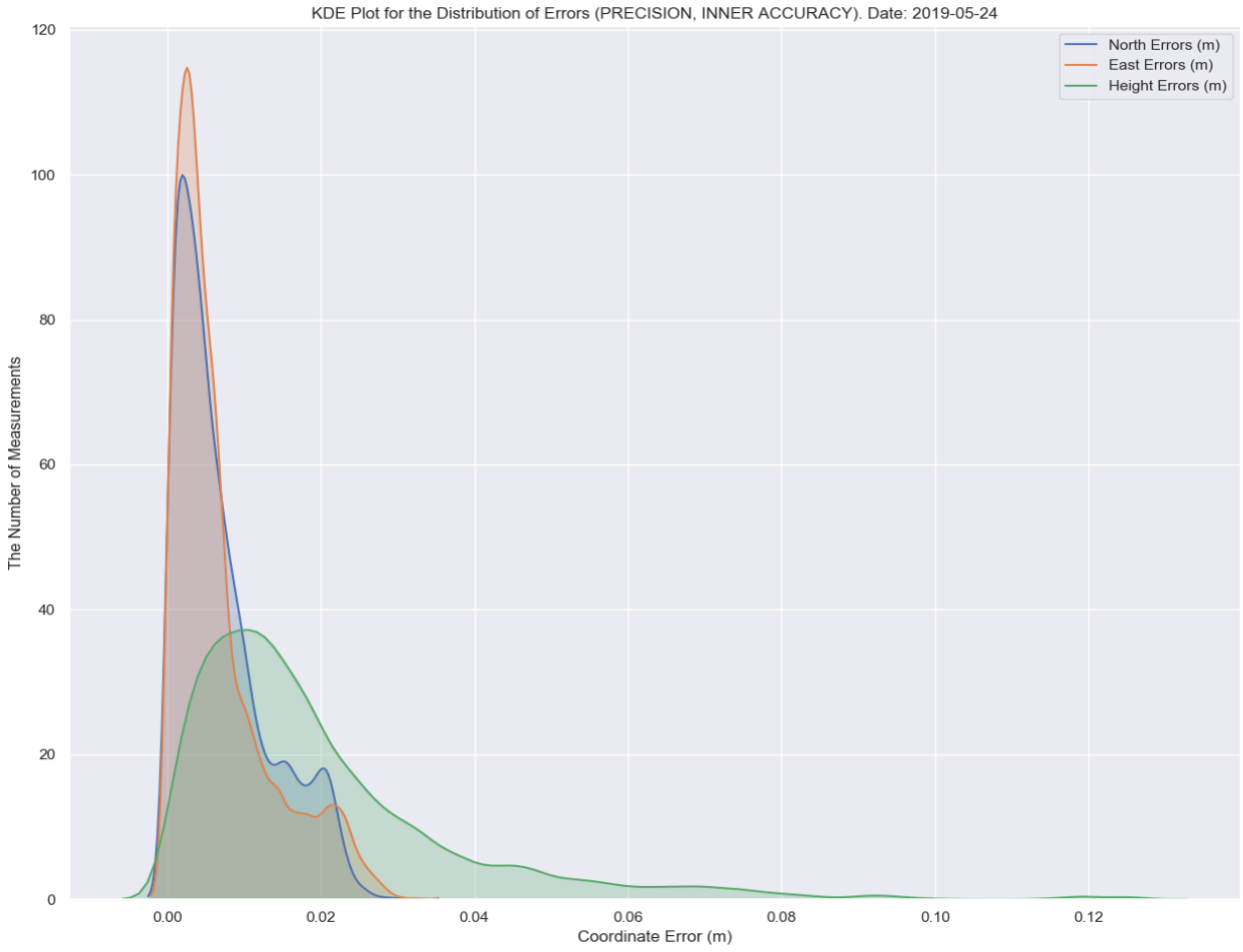
KDE Plot for Outlier Recognition (PRECISION, INNER ACCURACY)

METHOD1



KDE Plot for the Distribution of Errors (PRECISION, INNER ACCURACY)

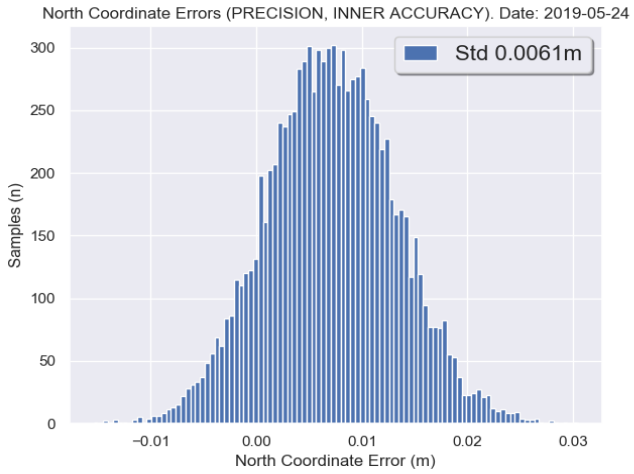
METHOD1

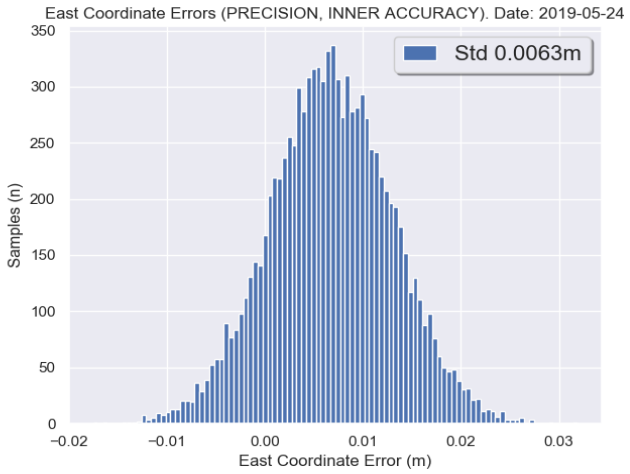


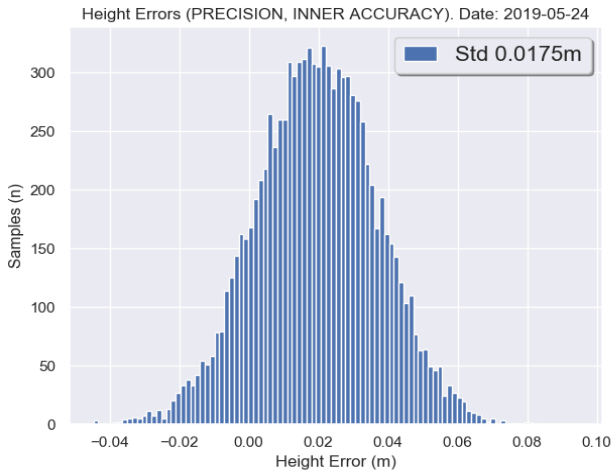
Gaussian Distribution Models for the Distributions of Errors
(PRECISION, INNER ACCURACY)

METHOD1

Gaussian Distribution Models for North and East Coordinate Errors, and Height Errors. Precision (Inner Accuracy):
User-Defined Sample Size (n): 10000

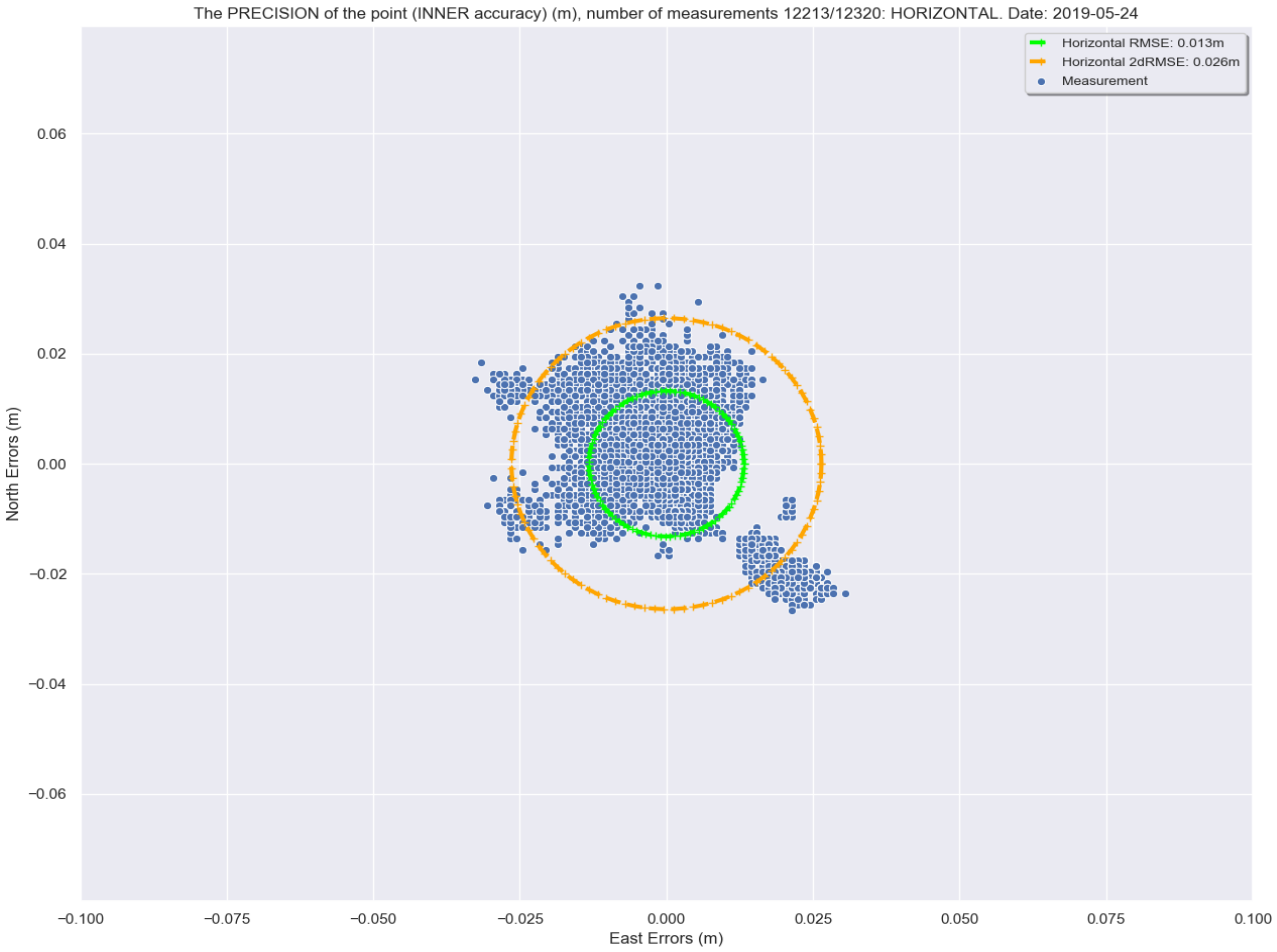






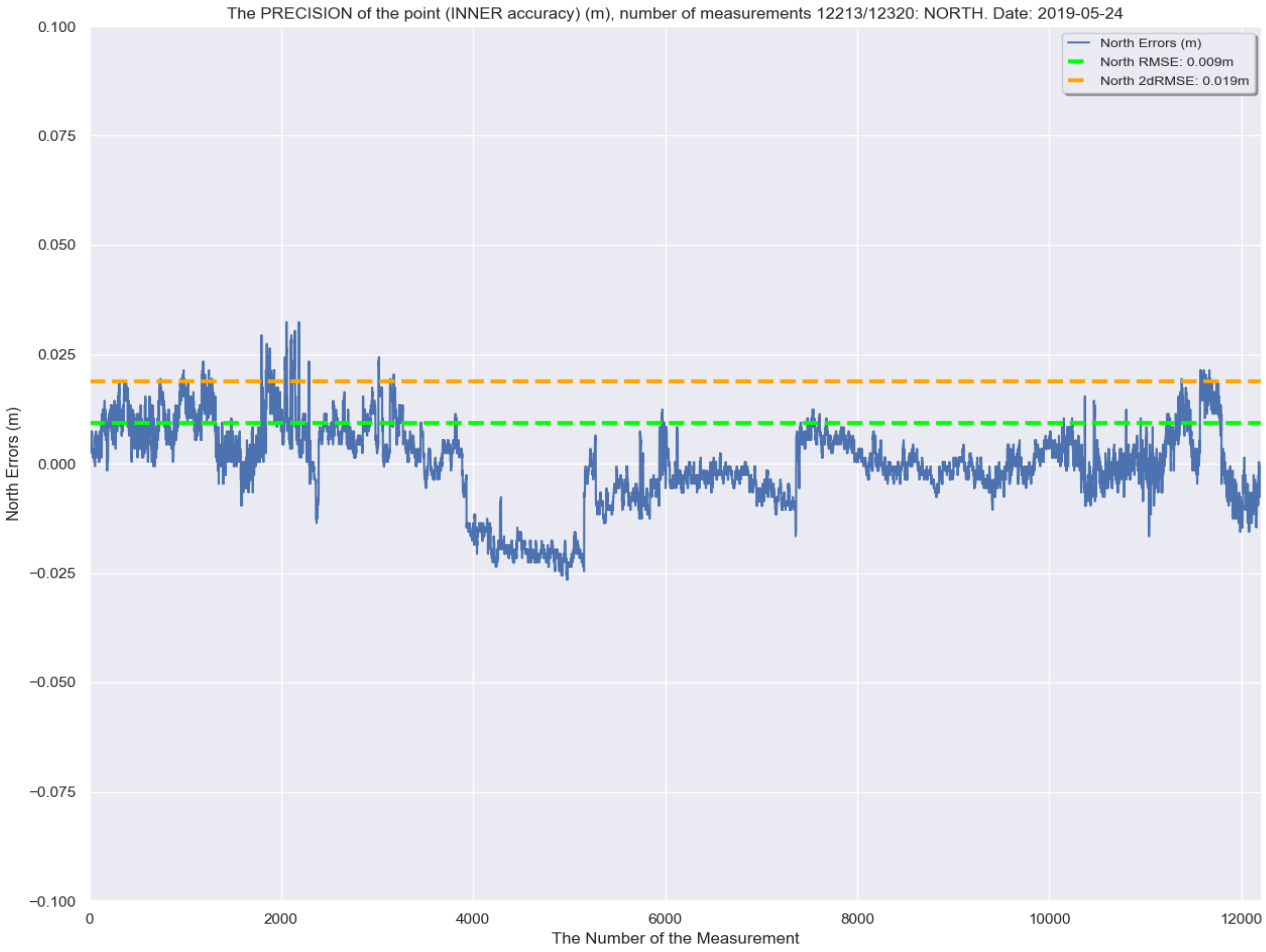
The PRECISION of the point (INNER accuracy) (m) HORIZONTAL

METHOD1



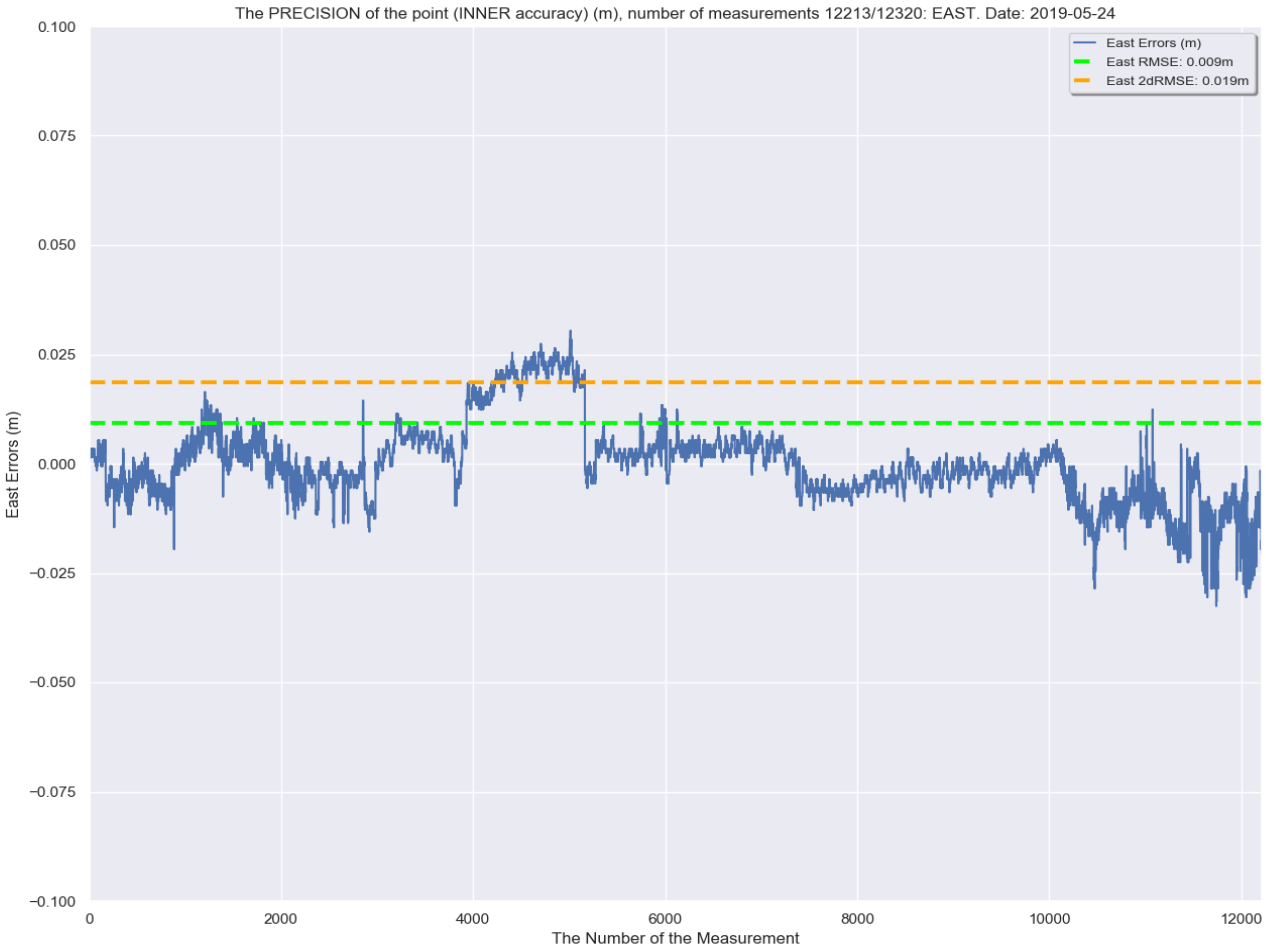
The PRECISION of the point (INNER accuracy) (m) NORTH

METHOD1



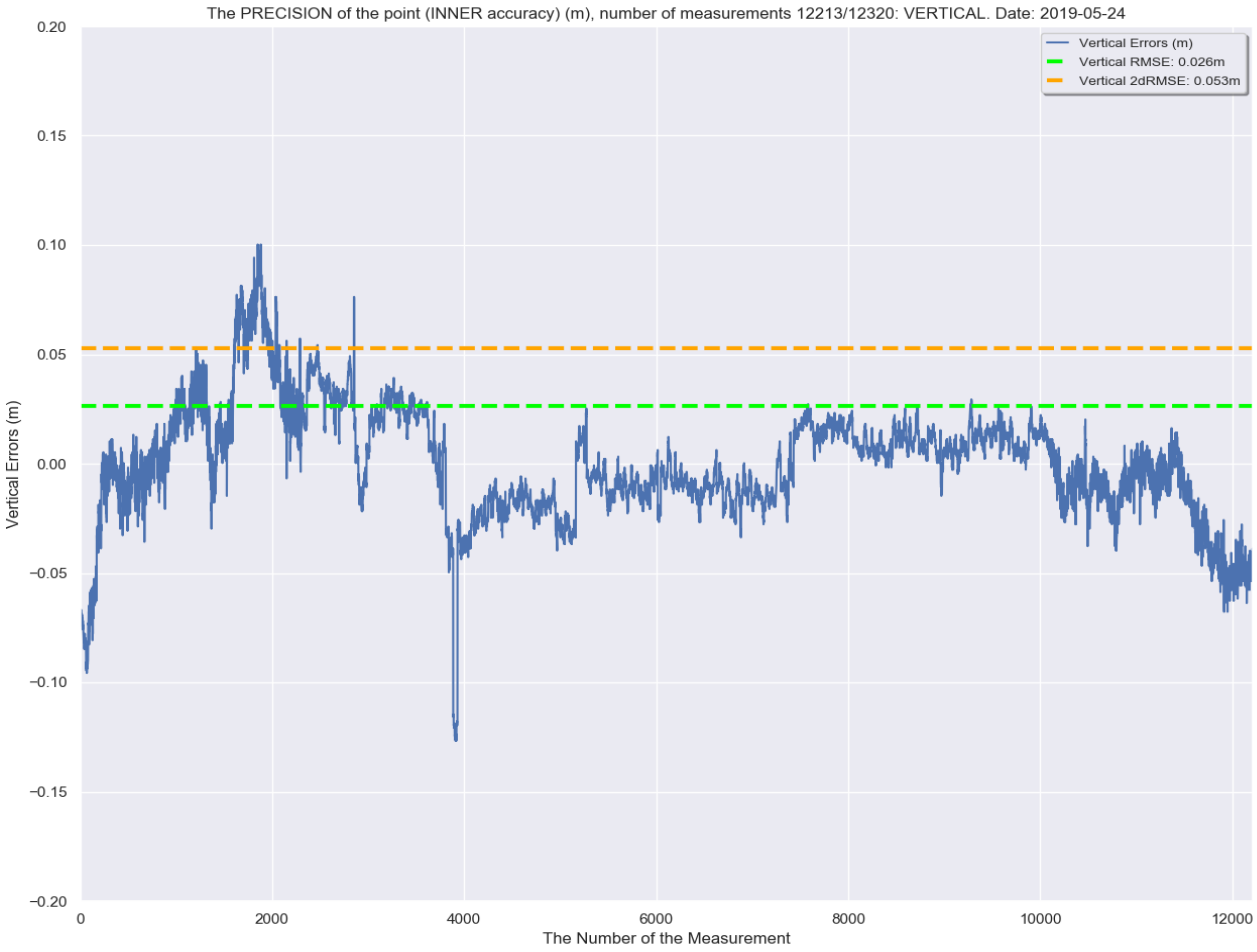
The PRECISION of the point (INNER accuracy) (m) EAST

METHOD1



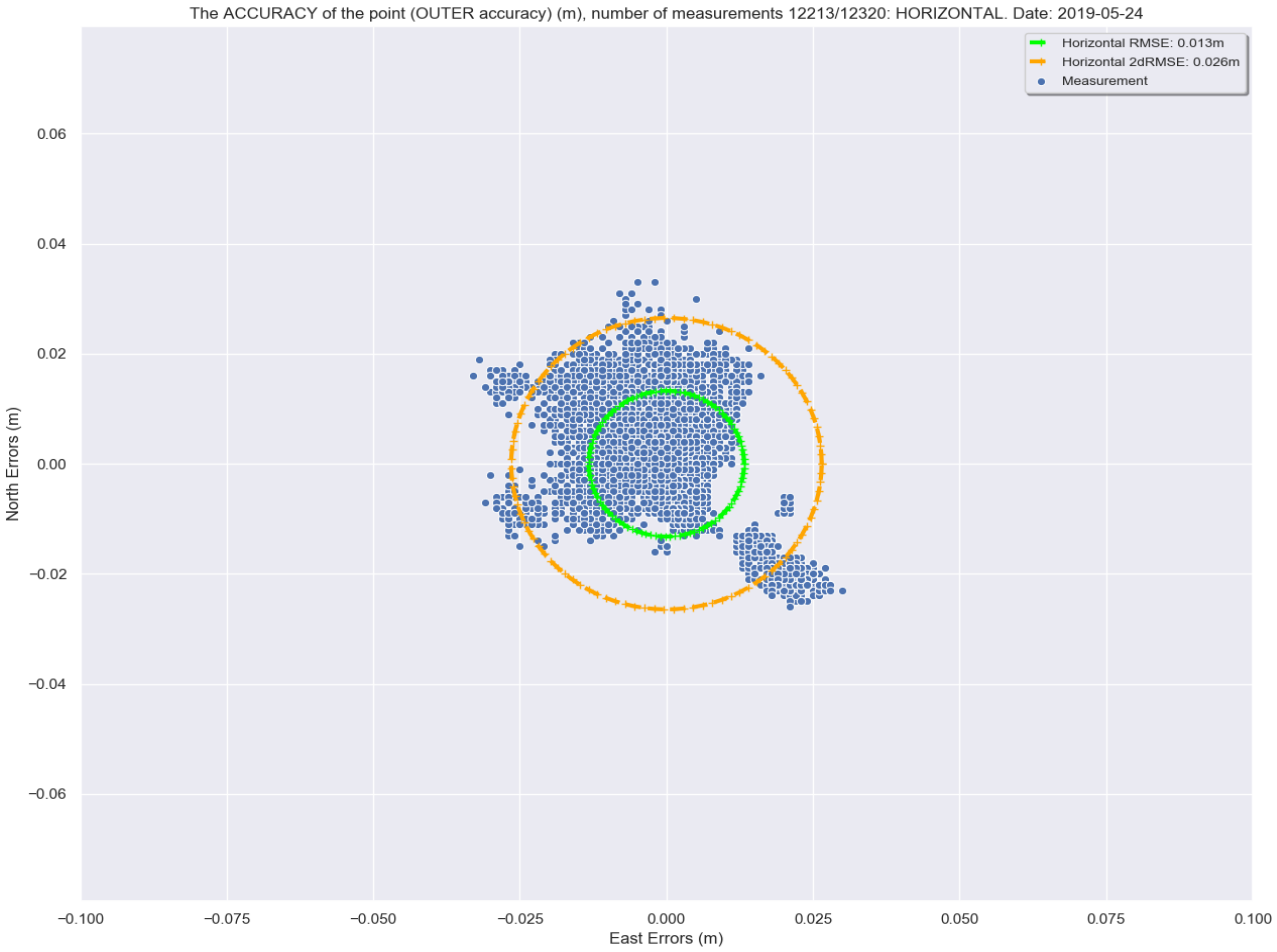
The PRECISION of the point (INNER accuracy) (m) VERTICAL

METHOD1



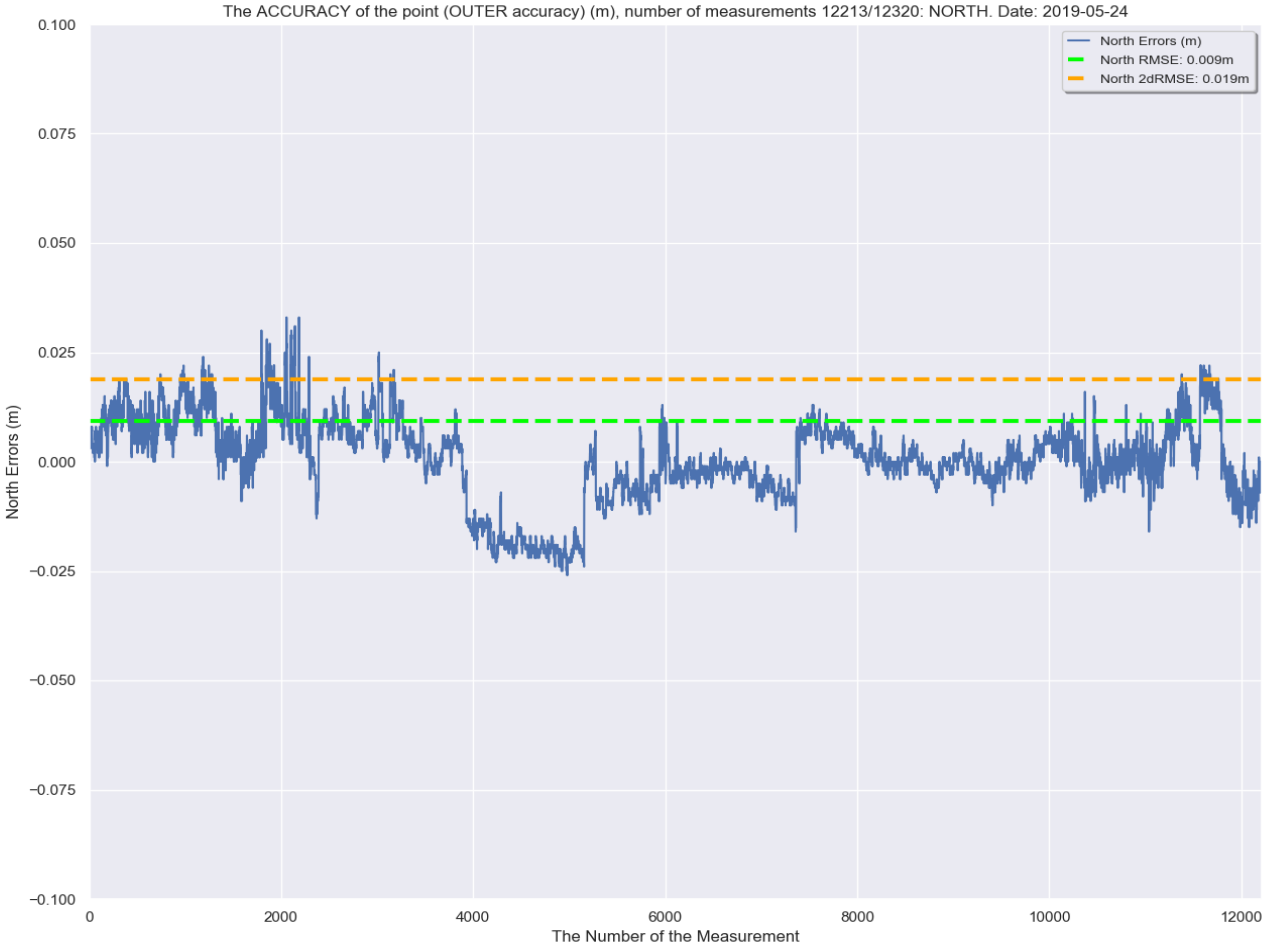
The ACCURACY of the point (OUTER accuracy) (m) HORIZONTAL

METHOD1



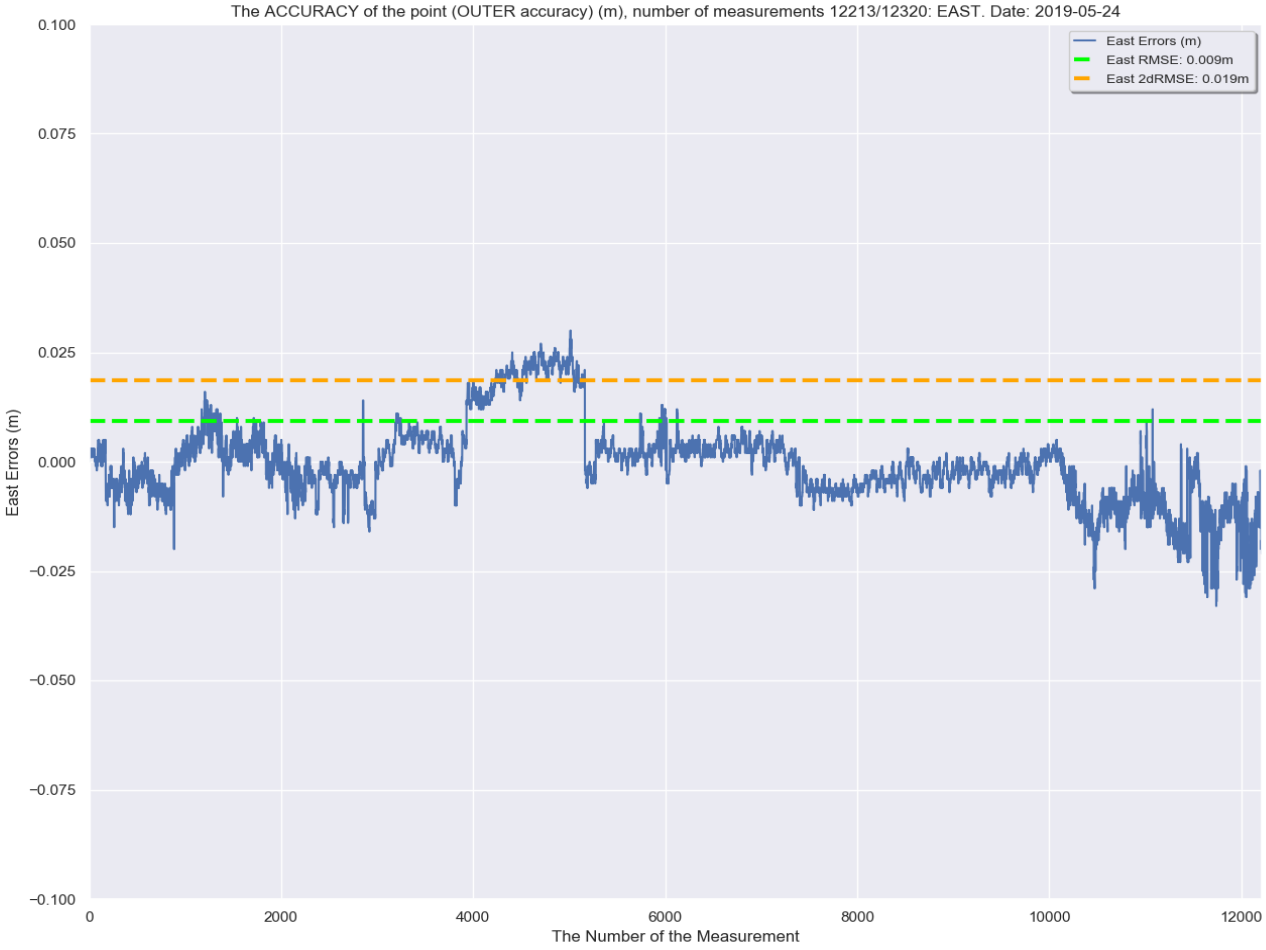
The ACCURACY of the point (OUTER accuracy) (m) NORTH

METHOD1



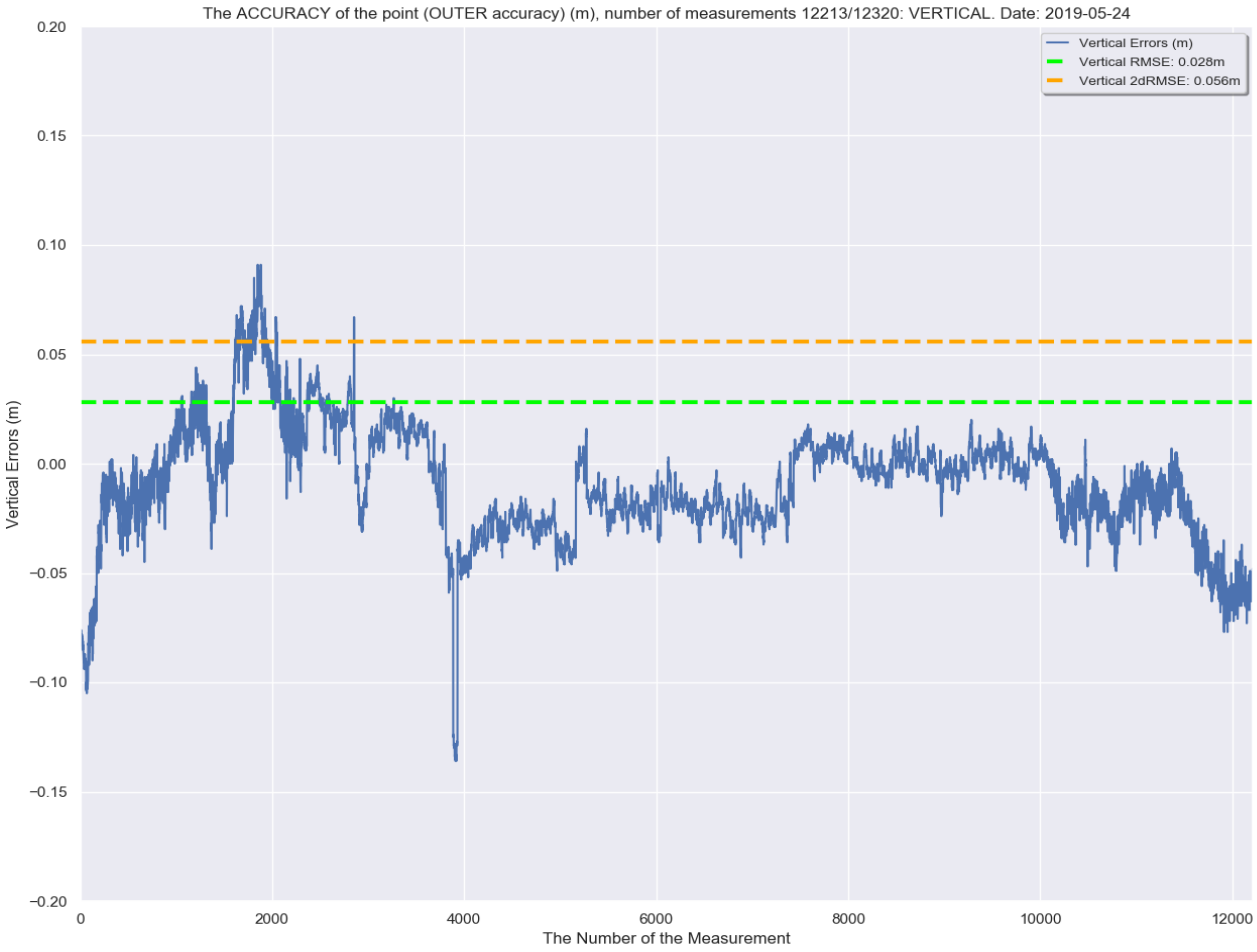
The ACCURACY of the point (OUTER accuracy) (m) EAST

METHOD1



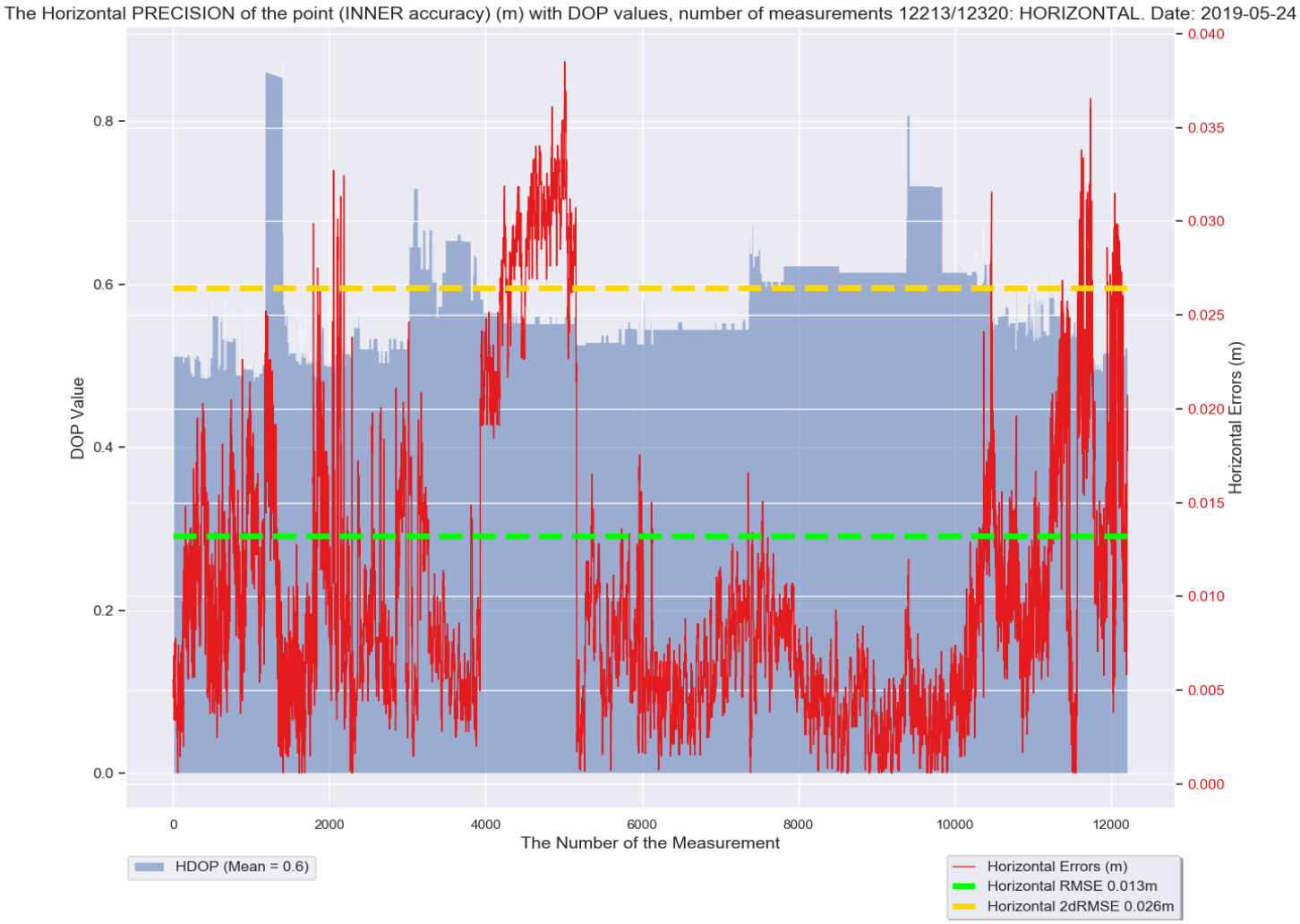
The ACCURACY of the point (OUTER accuracy) (m) VERTICAL

METHOD1



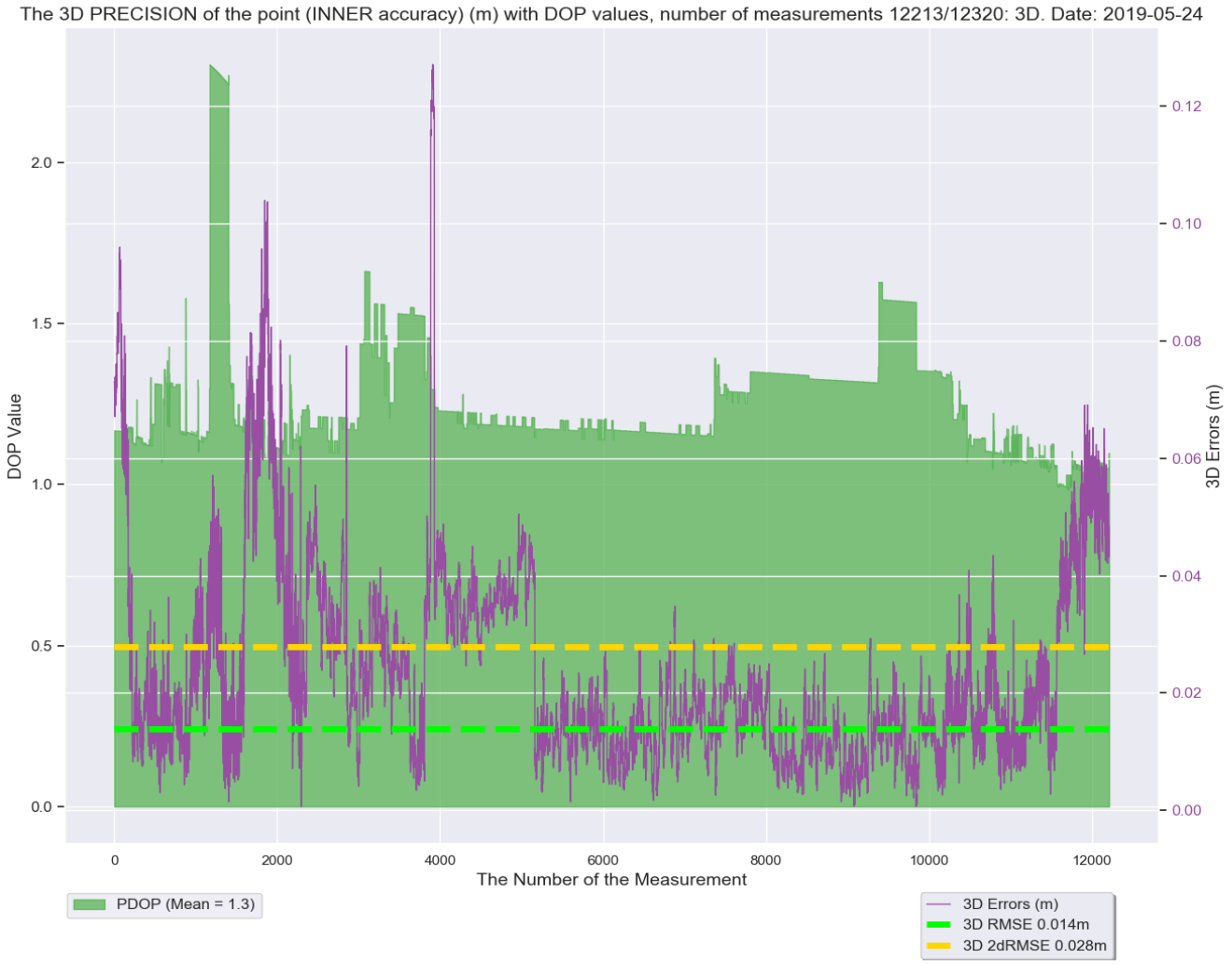
The Horizontal PRECISION of the point (INNER accuracy) (m) with DOP values

METHOD1



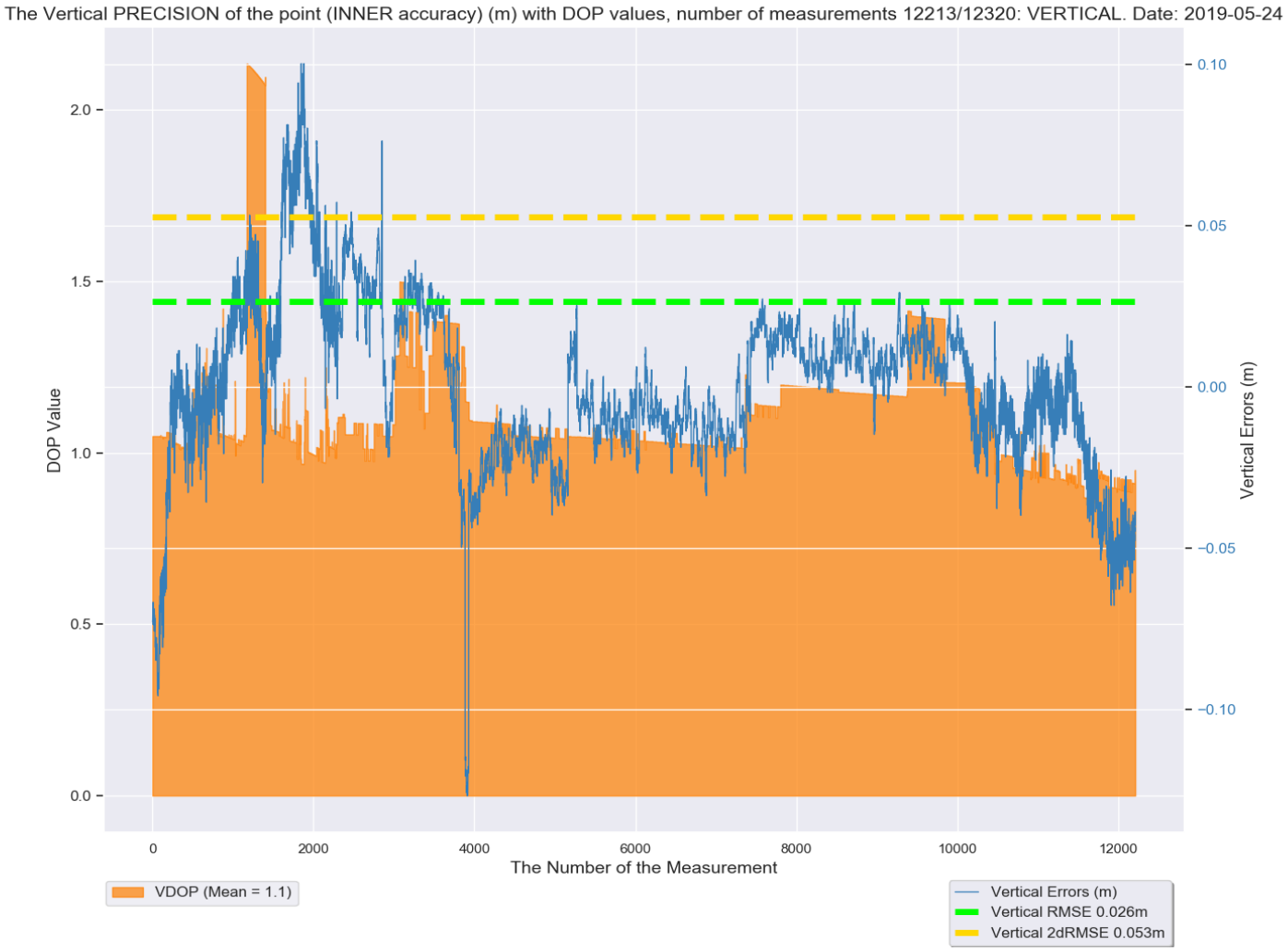
The 3D PRECISION of the point (INNER accuracy) (m) with DOP values

METHOD1



The Vertical PRECISION of the point (INNER accuracy) (m) with DOP values

METHOD1



Conclusions

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