Application Of The KSA-GEOID Model For The Validation Of GEOSA-DTM

GEOSA
الهيئة العامة للمساحة والمعلومات الجيومكانية
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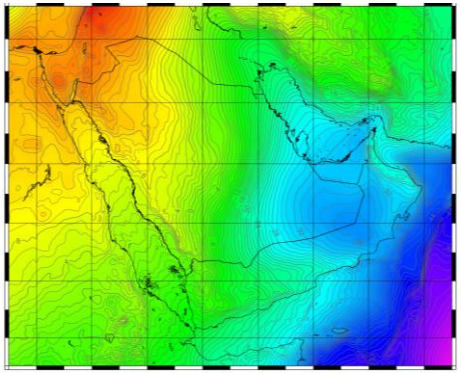
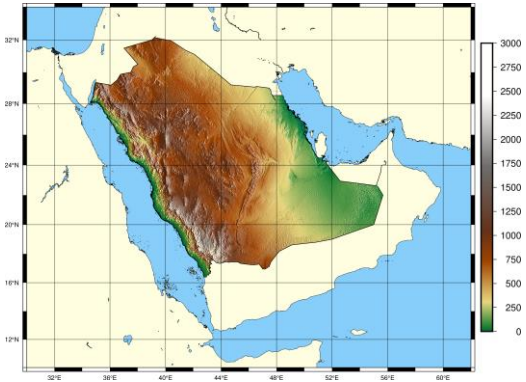
Kingdom of Saudi Arabia - GEOID 2021

Geoid Heights Accuracy **1.5 - 2.5 cm** all over the country



Kingdom of Saudi Arabia - Digital Terrain Model 2017

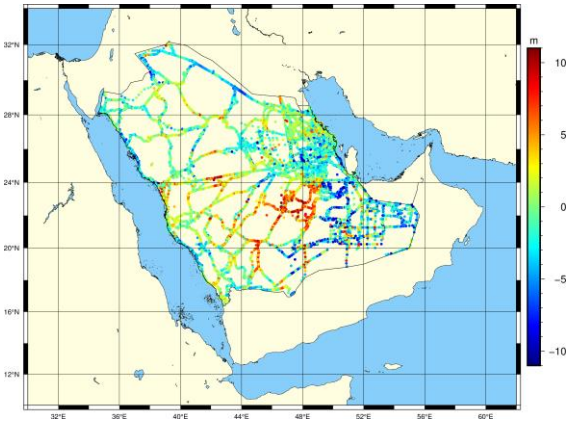
Heights Accuracy **~3 m**



Validation Of GEOSA-DTM

1 Office-based validation of KSA-DTM

17000 geodetic Benchmarks

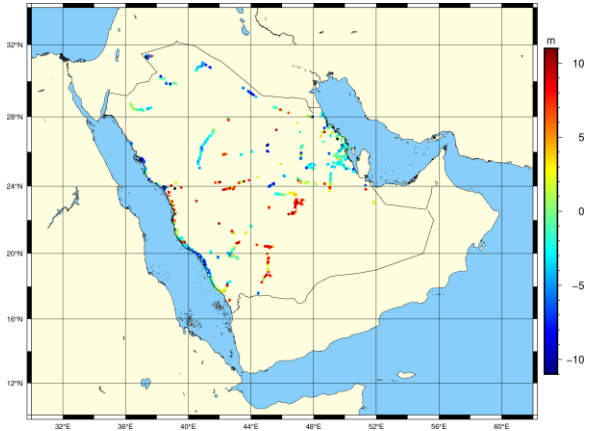


KSA-DTM17 & KSA-VRF14 residuals

2 Field-based validation of KSA-DTM

Real-Time Kinematic **352** Benchmarks

Kinematic Observation **54,807** Points



Spatial distribution of the residuals of observed orthometric heights with respect to KSA-GEOID21 and heights from KSA-DTM17

3 Modelling of systematic effects/errors in KSA-DTM

The field-based evaluation confirmed the availability of systematic effects which were necessary to model in order to determine the reliable transformation from KSA-DTM to KSA-VRF14.

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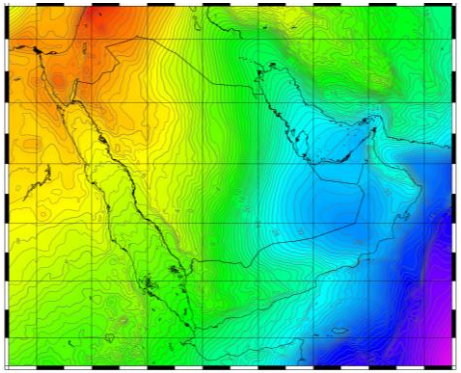

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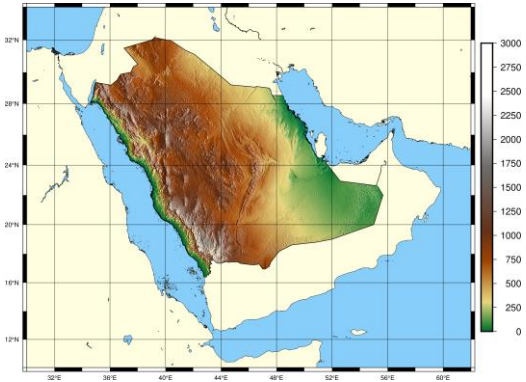
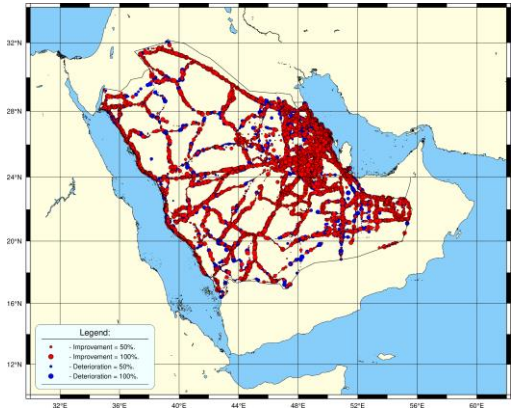


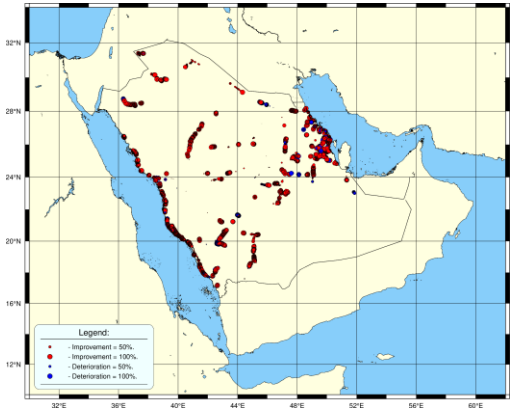
Validation Of GEOSA-DTM

4 Results

Parameters	Office data		Kinematic data		RTK data		All data	
	Original	Transformed	Original	Transformed	Original	Transformed	Original	Transformed
MAX [m]	10.987	8.812	10.429	8.247	15.626	16.535	10.623	8.398
MIN [m]	-10.967	-8.807	-10.415	-8.252	-14.050	-13.341	-10.604	-8.411
Mean [m]	-0.478	0.155	-0.965	-0.605	2.327	2.118	-0.833	-0.415
STD [m]	3.633	2.936	3.342	2.684	7.046	5.556	3.443	2.773



Improvement/deterioration of residuals with respect to transformed and original KSA-DTM (office data)



Improvement/deterioration of residuals with respect to transformed and original KSA-DTM (RTK & kinematic data)

- the improvement of the residuals retrieved by office and field data became 45% and 48%.
- Those improvements are spread over 65% of office data and 69% of field data.

Thanks

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