Land Relations and Cadastre Agency
Institute of Geodesy, Engineering Research and Cadastre

DEVELOPMENT OF THE NATIONAL GRAVITY NETWORK IN MOLDOVA

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Subjects

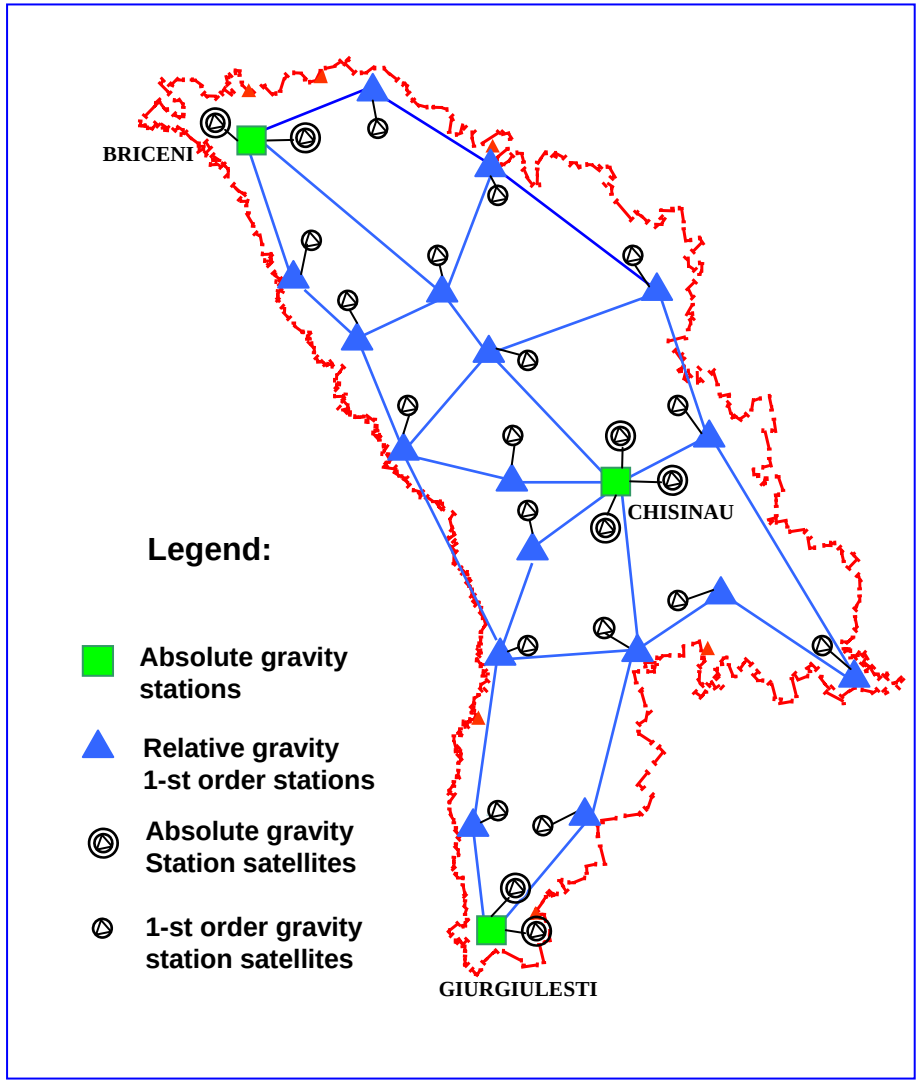
- Participating institutions
- The National Gravity Network design
- The absolute gravity measurements
- The relative gravity measurements
- Computations and analysis
- Way ahead

Participating institutions

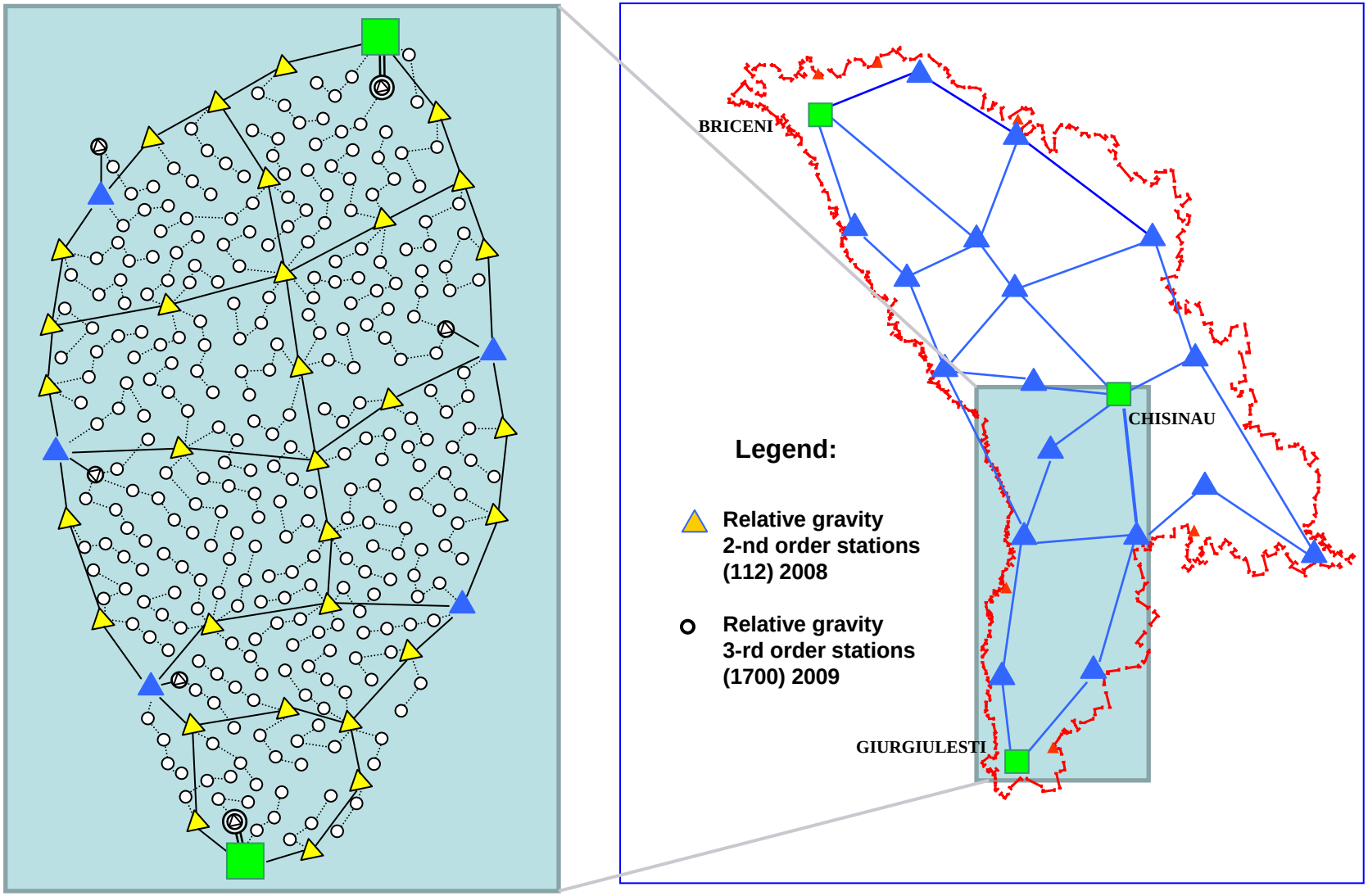
- Land Relations and Cadastre Agency
- National Geospatial-Intelligence Agency
- Institute of Geodesy, Engineering Research and Cadastre
- National Army Topographic Service
- Institute of Geophysics and Geology of the National Academy of Sciences of Moldova
- Technical University of Moldova

The National Gravity Network design

- **3 absolute gravity stations (2006):**
  seismic observatories pillars
- **7 absolute gravity station satellites**
  EUREF sites and fundamental leveling benchmarks
- **17 first-order relative gravity stations (2006):**
  seismic observatories pillars
  EUREF sites, cathedrals and monuments
- **17 first-order gravity station satellites**
  geodetic control points and leveling benchmarks



The National Gravity Network design



The absolute gravity measurments

•The FG5 107 absolute gravimeter ran for 24 to 36 data sets, one set of 100 drops per hour

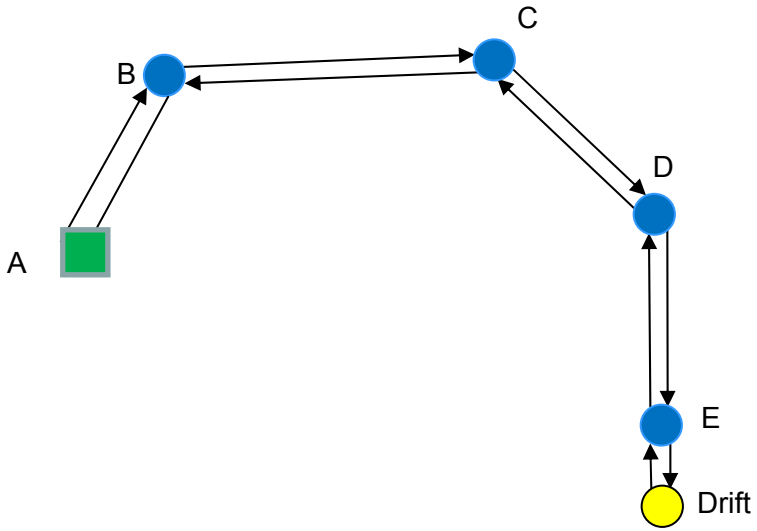
•A vertical gradient was measured at each absolute station using a combination of three LaCoste & Romberg model G gravimeters.

• Micro-g Solutions program “g” version 4.0 compute the absolute observations.
• Standard input parameters:
– earth tides
– speed of light correction
– local barometric pressure correction
– DC tidal term (Honkasalo correction)
• The total uncertainty value of the absolute gravity measurements is about 5 μGal.

Station name	Gravity Value (mgal)	Total uncertainty (mGal)	Standard deviation (mGal)
CHISINAU AA	980767.445	0.00444	0.00078
GIURGIULESTI AA	980628.643	0.00507	0.00255
BRICENI AA	980867.919	0.00453	0.00116

The relative gravity measurements

- First-order base stations were established using three LaCoste & Romberg model G gravimeters in standard double ladder sequence loops
- Each station was observed at least twice by each meter
- A gravity measurements were combined in the multi-sessions network adjustment.



Computations and analysis

- The preliminary data processing was performed by GVREC, ETIDE and GVCOMP programs
- The network adjustment was performed by GRAVNET program
- The RMS value of the relative gravity stations is better than 10 μGal
- The difference of gravity values between the previous preliminary network (2000) and the new one vary from +19μGal to +85 μGal.

Station name	Gravity Value (mGal)	RMS (mGal)
HINCESTI D	980762.084	0.007
LEOVA B	980751.437	0.007
BASARABEASCA D	980739.426	0.007
CAUSENI D	980762.251	0.009
PALANCA E	980727.001	0.009
CAHUL B	980670.650	0.008
TARACLIA C	980670.489	0.007
NISPORENI D	980798.552	0.008
UNGHENI C	980801.701	0.007
CRIULENI D	980802.994	0.007
COSTESTI D	980860.949	0.008
FALESTI D	980822.745	0.008
BALTI C	980846.797	0.007
OTACI E	980867.847	0.008
SOROCA B	980887.697	0.008
REZINA D	980849.917	0.008
TELENESTI C	980837.674	0.007

Way ahead

- **The relative gravity network densification about 1 point per 15-20 square kilometres for geophysical applications, precise levelling and the high resolution local quasigeoid modelling**

- **Improvement of normal height determination accuracy from GPS measurements and service organizing for height anomalies calculation in order to distribute real time normal heights**

- **Integration of the gravity data in the IGFS and EUREF programs**

Thanks for your attention

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