NATIONAL REPORT OF ALBANIA

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Content:

1. Networks of Permanent Reference Stations
2. Gravimetrical measurements
3. Establishment of New Vertical Reference
4. Construction of new tide-gauges network

ALBPOS 2009 ÷ 2014

ALBPOS (Albanian Positioning Service):

- established in 2009; fully operational in 2010
- 16 permanent GNSS stations and the Control Centre
- Trimble has provided the final coordinates in ITRF2005, Epoch 2009.926

ALBPOS 2009 ÷ 2014

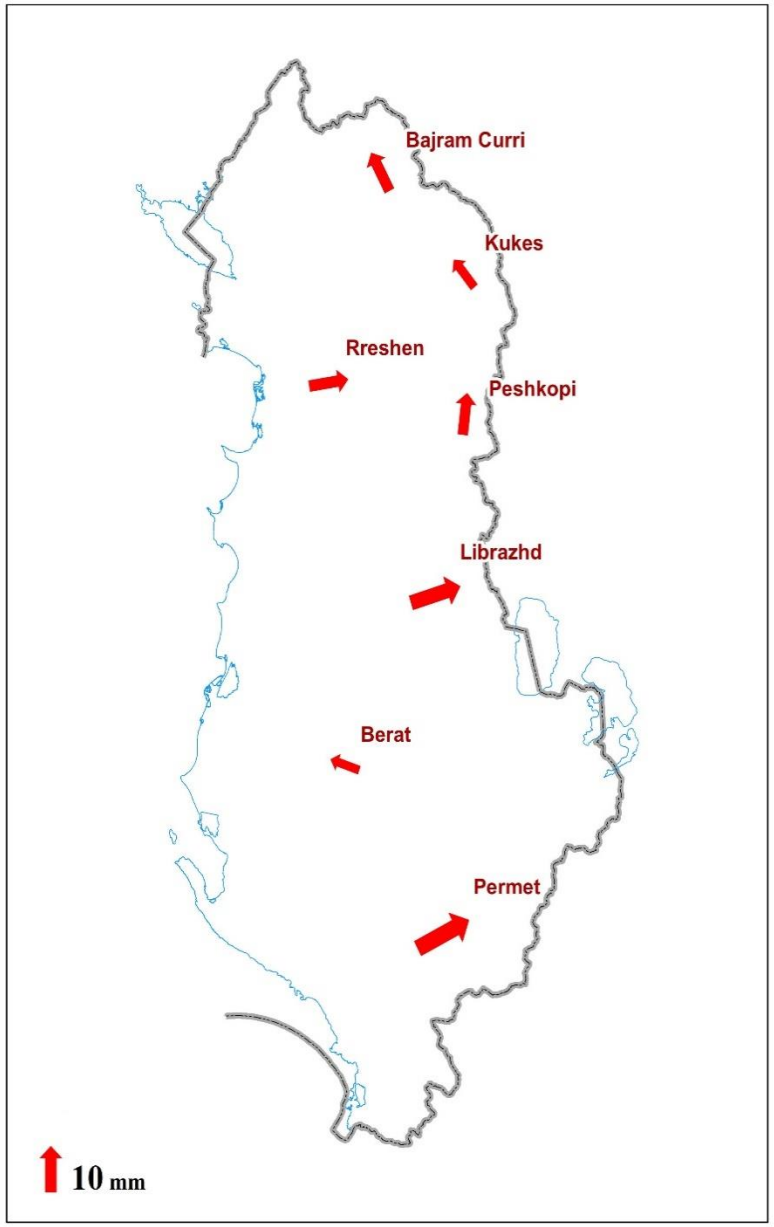
- re-processing of 15-days GNSS data (Stangl G., Feb 2010)
- final coordinates in IGS05, Epoch 2009.926 transformed into ETRF2000, Epoch 2008.0

- interrupted 2011 ÷ 2013
- twins project between Lantmäteriet & Immovable Property Registration Office (IPRO), restarted in 2013
- the GNSS data of 15 ALBPOS stations (24h), March 3 ÷ 9, 2014 had been processed (Valsson G., 2014)
- the internal quality is around: 1 mm in *X/Y* and 2 ÷ 5 mm in *Z*
- final coordinates in ITRF2008, Epoch 2014.177 transformed into ETRF2000, Epoch 2014.177 and

ALBPOS 2009 ÷ 2014

- compared to early realization (Stangle G., 2010): ETRF2000, Epoch 2008.0, to get an indication of the internal velocities.
- the differences between Epoch 2008.00 - Epoch 2014.177:

Station	*dX* (mm)	*dY* (mm)	*dZ* (mm)	*dS* (mm)
BAJR	-4.89	2.55	-6.8	8.76
BERA	-1.53	4.37	-3.29	5.68
KUKE	4.14	-3.33	-3.54	6.38
LIBR	3.97	12.74	-5.14	14.30
PERM	6.3	12.24	-10.38	17.24
PESH	7.57	0.87	-3.69	8.47
RRES	0.82	5.05	-7.37	8.97

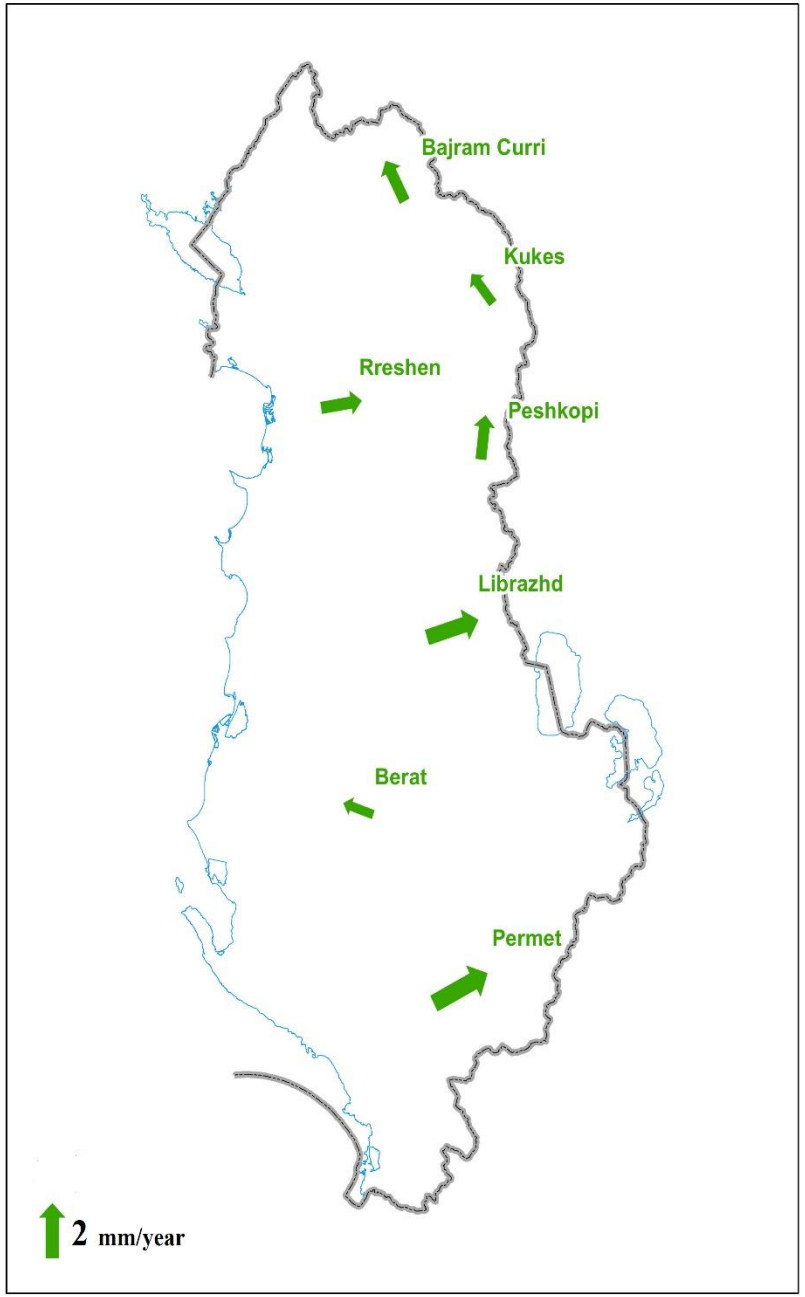


ALBPOS 2009 ÷ 2014

- the internal velocity vectors from

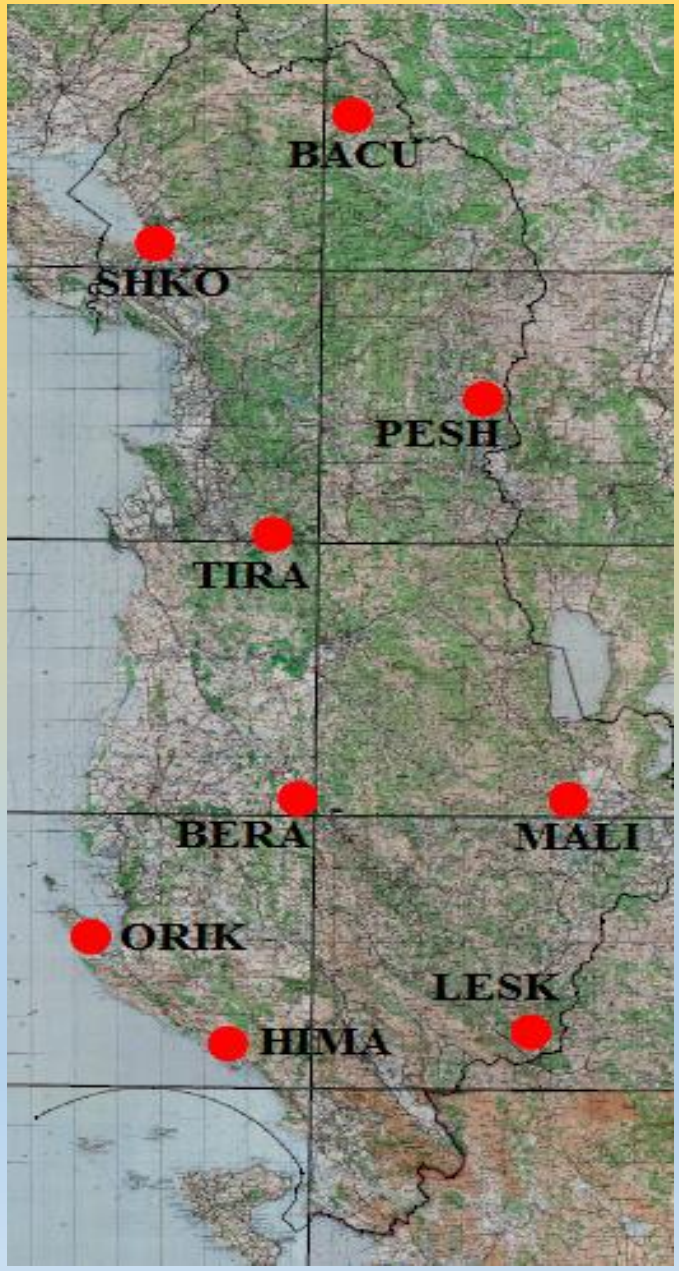
Epoch 2008.00 to Epoch 2014.177

Station	*dX* (mm/year)	*dY* (mm/year)	*dZ* (mm/year)	*dS* (mm/year)
BAJR	0.79	-0.41	1.10	1.42
BERA	0.25	-0.71	0.53	0.92
KUKE	-0.67	0.54	0.57	1.03
LIBR	-0.64	-2.06	0.83	2.32
PERM	-1.02	-1.98	1.68	2.79
PESH	-1.23	-0.14	0.60	1.37
RRES	-0.13	-0.82	1.19	1.45



GEWEI's GPS Continuous Operation Reference Stations

- 6 (9) permanent GPS stations, started in 2003 (Kuka N., 2015)
- operated by Geosciences, Energy, Water and Environment Institute of Tirana
- the purpose to monitor the tectonic deformations
- equipped with dual-frequency GPS receivers
- antennas are mounted on concrete pillars, founded on the bedrock
- data transfer is made via radio-links or mobile 3G



GEWEI's GNSS Continuous Operation Reference Stations

Shkodra's station

Himara's station

GEWEI's GNSS Continuous operation reference stations

- interrupted in 2009 due to lack of fund supports
- restarted the operation in July 2013
- at present, all the stations are in operation
- 30-*sec* interval data are stored, website (*ftp*: geo.edu.al)
- GPS data are freely available

- not included in processing of ALBPOS data of March 3 ÷ 9, 2014
- these stations have been suggested to monitoring the ALBPOS

Geoid of Albania

- neither relative nor absolute gravity measurements
- not any local gravimetrical geoid model is established
- planned to perform absolute gravimetrical measurements (Sept/Oct 2015) in:

Shkodra, Tirana and Saranda

with dense 1 point/ 10 000 km^2

initial gravimetric point in Tirana

EUREF 2015, Leipzig, Germany; 2-5 June 2015

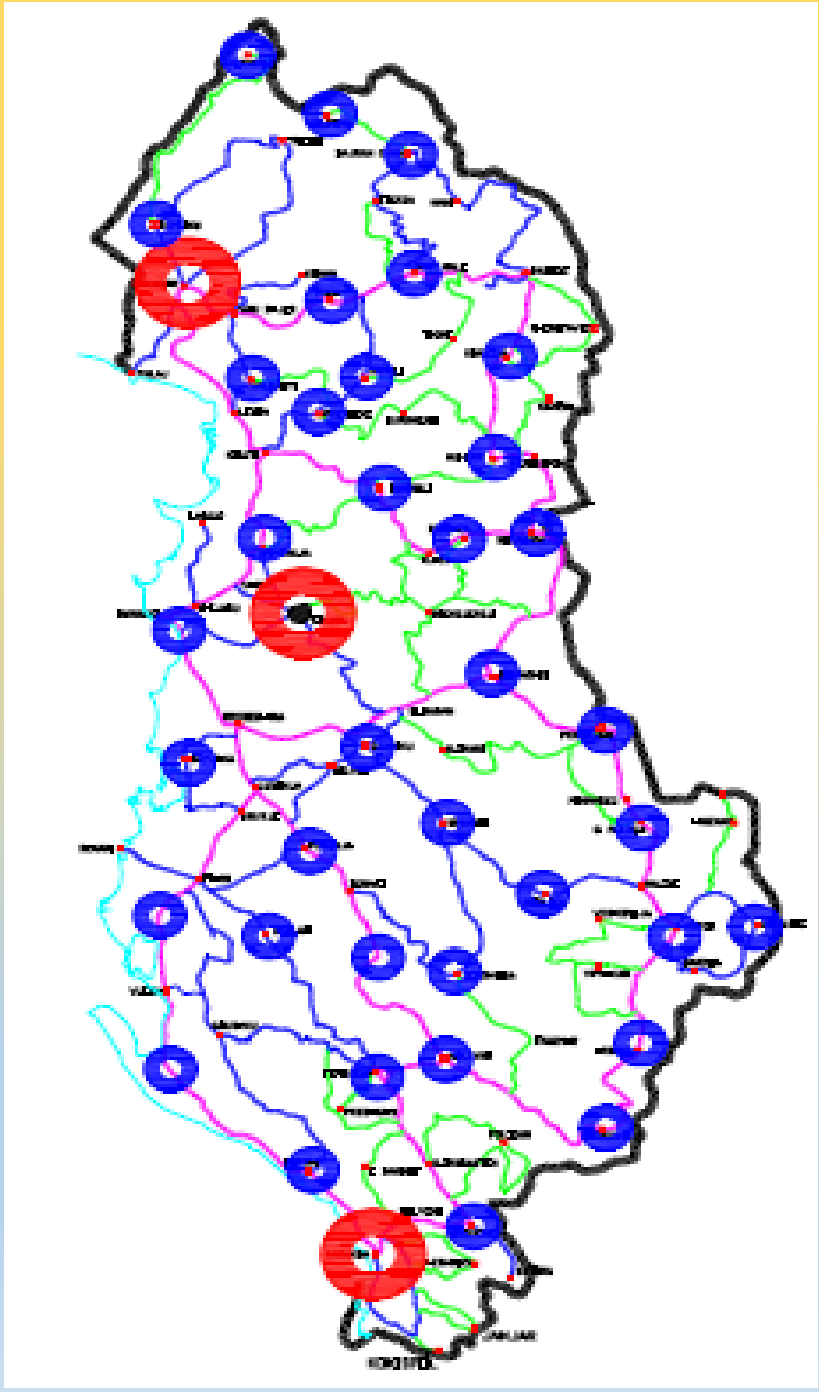
Geoid of Albania

- Gravimetric network of ***I-st*** **order** consists of **30 points**

  with dense 1 point/ 1 000 km^2

- planned to be:

  - of high precision levelling network or
  - geodetic control points and high precision levelling network



Geoid of Albania

- Gravimetric network of ***II-nd*** **order**

  consists of **140 points**

  with dense 1 point/ 200 km^2

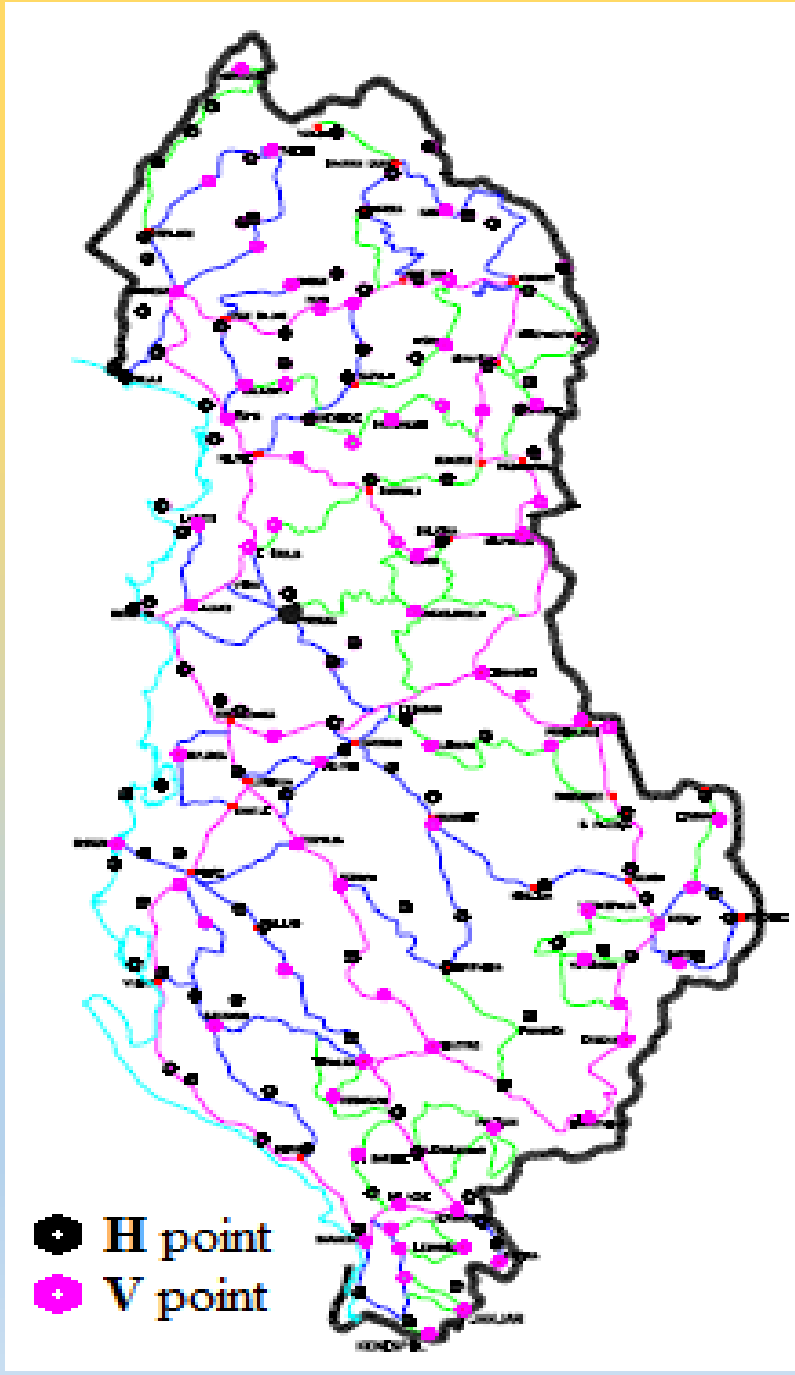
of geodetic control points and high precision levelling network

- Gravimetric network of ***III-st*** **order**

  consists of **14 000 points**

  with dense 1 point/ 2 km^2,

  designed to be free materialized



The status of Albanian Vertical Reference

- 1913 ÷ 1918, no information about the "*zero*" of the heights reference

- 1934 ÷ 1942, the "*zero*" of heights was determined considering a month observations in Durres's tide gauge station

- **1970 ÷ 1987**, Mean Sea Level has been determined on the base of uninterrupted 24-hours recordings (1958 ÷ 1976) in Durres's tide gauge station

- The incorrect operation or operating with interruptions of Durres's tide gauge station till later on 1990, doesn't allow to judge what really happened with the Mean Sea Level in Albania

New Vertical Reference of Albania

- the levelling network should be repaired by physical viewpoint
- new levelling lines along actual road infrastructure (built after 1990)
- the network consists of about 800 benchmarks, representing approximately 15 000 km double
- first order levelling network with the measurement tolerance higher than the early reference should be done
- the measurements will be accompanied by gravimetric measurements

New tide-gauges network of Albania

- the bathymetric measurements performed in different periods

- a new project is designed (ALNO HIP), join in collaboration:

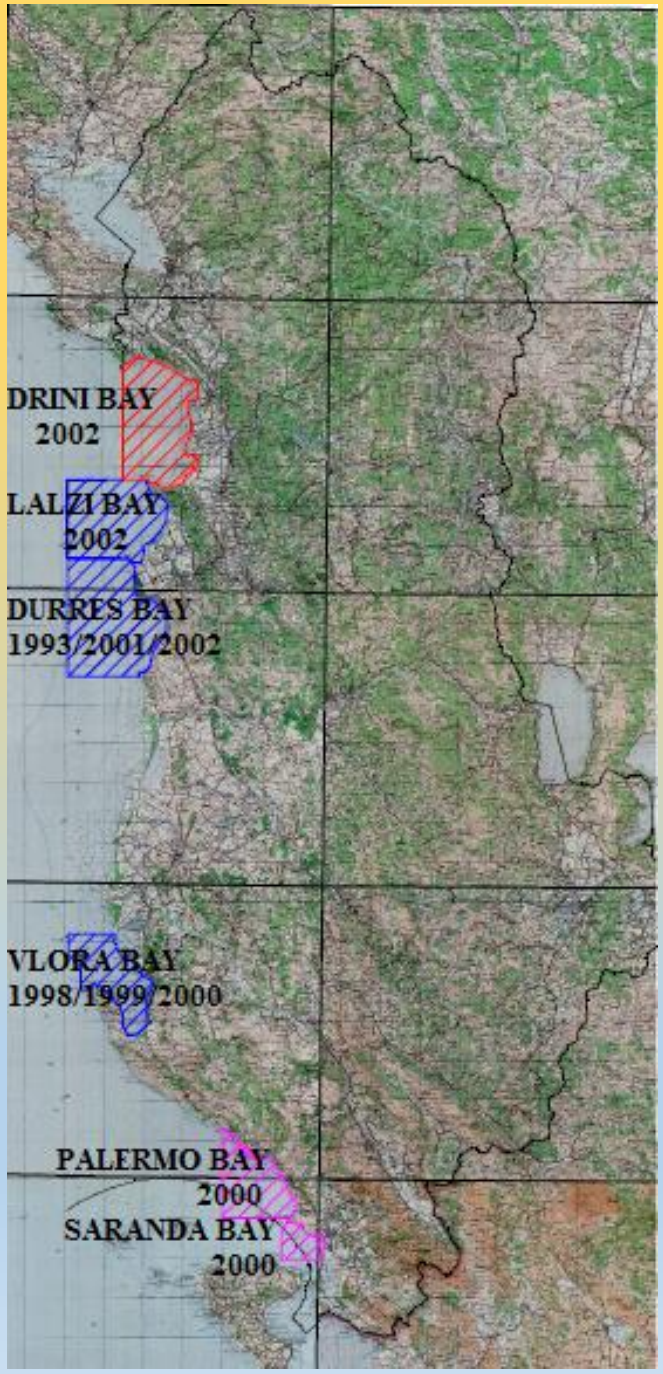
  Albanian Hydrographic Service (AHS)

  Military Geograpich Institute (MGI)

  Norwegian Hydrographic Service (NHS)

- the area under study is an extension of 220 miles (407 km)/ of about 11 000 km^2

- within the project is planned to construct the new tide-gauges network



New tide-gauges network of Albania

- to complete with modern equipments
- it's planned establishing of three tide gauge stations more (Saranda, Zvernec,Shengjin)
- they had been in operation for intermittent short periods
- no information about the equipments
- it's planned to perform the high precision geometric levelling between tide gauge stations

Thank you
for your attention!