

# The IVS Network Station Crimean Astrophysical Observatory: Local Geodetic Network at Simeiz Geodynamics Test Area

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## Abstract

This report gives an overview about the geodetic VLBI activities at the Simeiz station. The positions of the points in the fundamental geodynamics area "Simeiz-Katsively" have been determined by special campaign.

## 1. Observations and Data Analysis

In 2005, we were involved in 11 IVS sessions, but we lost two sessions for LO problems. During last year Simeiz station regularly participated in various radio astronomy programs including the Near Real Time Radar VLBI and single dish observations.

Geodetic VLBI observations at 2 and 8 GHz are used to determine the fine structure of 80 compact extragalactic radio sources. The observations began in 1994 with five-six sessions per year. All ten VLBA antennas together with up to ten additional (geodetic and EVN) radio telescopes participated in the observations. Figure 1 shows image of the radio structure of the source 1308+326 at 2 and 8 GHz.

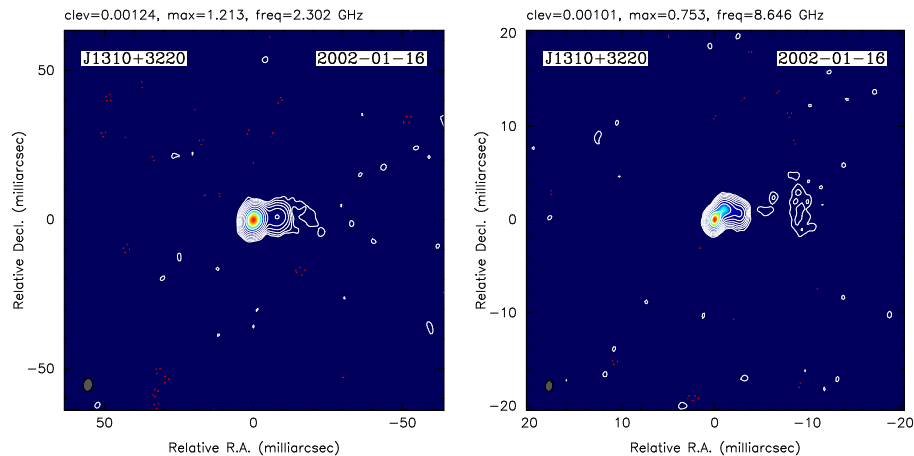


Figure 1. Radio structure of 1308+326 at 2 and 8 GHz.

Figure 2 shows the flux density at 4.8 - 36 GHz. The radio light curves at 36 and 22 GHz were obtained with Simeiz and Metsahovi, and at 14.5, 8.0 and 4.8 GHz at UMRAO.

VLBI imaging of extragalactic sources at frequencies 2 and 8 GHz with integral flux density 4.8 - 36 GHz monitoring are combined. Figure 3 shows the visibility function of 1308+326 for 7 epochs.

The character of the multifrequency flux variations is similar to that predicted by expanding source models; the outburst is unlikely to produce a detectable new cm-VLBI component. In the latter case the multifrequency light curves track each other with no time delays and similar

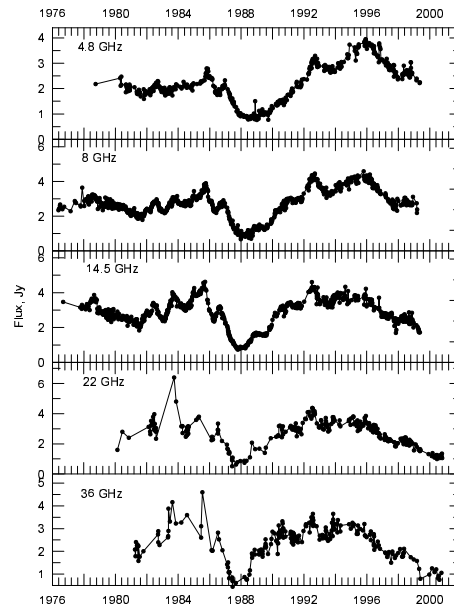


Figure 2. The flux density at 4.8 - 36 GHz.

amplitudes; the outburst is likely to be followed by an ejection of new cm-VLBI component from core.

## 2. The Simeiz Fundamental Geodynamics Area

The Radio Astronomy Laboratory of the Crimean Astrophysical Observatory with its 22-m radio telescope is located near Simeiz 25 km west of Yalta. The Simeiz geodynamics area consists of the radio telescope RT-22, two satellite laser ranging stations, a permanent GPS receiver and a tide gauge. All these components are located within 3 km.

The positions of the points in the Simeiz geodynamics test area have been determined by the special Third GPS Survey Campaign by Main Astronomical Observatory in August 2004. Results are presented in Table 1.

Table 1. Final solution for coordinates of points in the Simeiz area.

Station	X, m	Y, m	Z, m
RT22G	3785230.904	2551207.524	4439796.448
RT22	3785223.388	2551202.451	4439787.574
KATS-SLR	3785944.414	2550780.660	4439461.335
SIMI-SLR	3783902.266	2551405.032	4441257.506
GPS-CRAO	3783897.116	2551404.411	4441264.266

Absolute offsets of reduction points of the radio telescope RT-22 and two satellite laser ranging stations from 1994 to 2004 are given in Table 2.

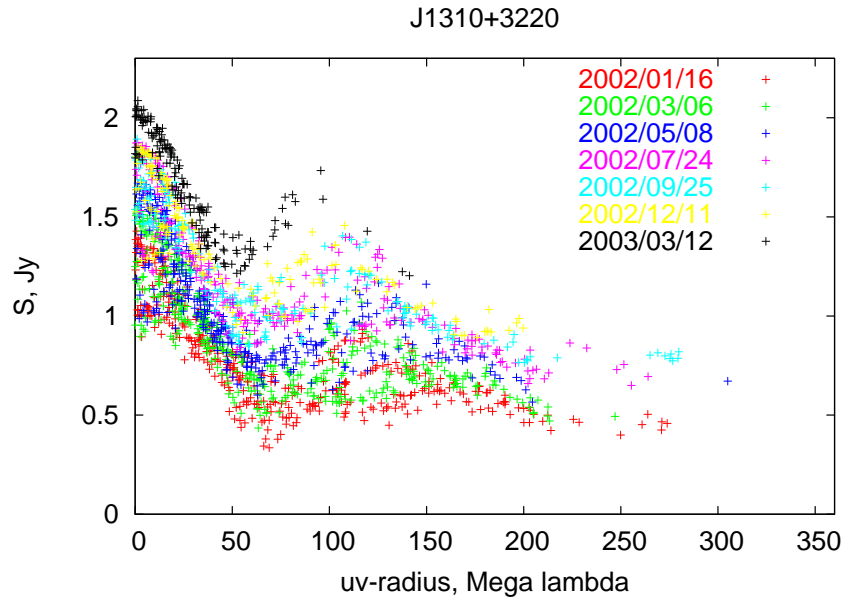


Figure 3. The visibility function for 7 epochs.

Table 2. Offsets for 10 years of the coordinates of points in the Simeiz area.

Station	dX	dY	dZ
RT22G	-0.216	0.126	0.077
KATS-SLR	-0.200	0.137	0.032
SIMI-SLR	-0.230	0.134	0.069



Figure 4. The Simeiz geodynamics area.

### 3. Future Plans

The VLBI activities in 2006 will consist of:

1. carry out modernization of the VLBI equipment (Mark 5 system);
2. creation of the prototype of a system of monitoring of geodynamic phenomena of mountain region of Crimea and geotectonic of the Black Sea basin.

### 4. Acknowledgment

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