

World Heritage in Russia (atlas of Space images)

Elena Smirnova

NGO "Transparent World", Rossolimo str. 5/22, building 1 Moscow 119021 Russia – smirnova@scanex.ru; atlas@transparentworld.ru

Abstract – It is worthwhile to monitor 10 World Heritage sites located in Russia (including two transboundary ones) using Space images of the Earth. This choice was limited by the following factors– the object's size (area) and its type (land, water body or buildings and constructions). The Atlas "World Heritage in Russia" was prepared based on Space imagery – mainly the images from the MODIS (Terra), ETM+ (Landsat) and PAN&LISS (IRS). This Atlas is basically aimed at such spheres as the education and popularization of the information on various objects. The Atlas also serves to show possibilities of using the remotely sensed data for studying, control, and monitoring the World Heritage sites.

Keywords: World Heritage, UNESCO, atlas, monitoring, protected area

INTRODUCTION

The sites included into the UNESCO World Heritage list are of outstanding value to the humanity. Many of these natural and cultural objects are unique. The exceptional natural and man-made sites which show both the nature wealth and the capabilities of the human mind should be preserved.

The World Heritage sites are to be studied and monitored by many ways. However the role of using Earth's images from Space is great due to this data relative cheapness and objectivity.

This article is devoted to the preparation of the Space imagery Atlas called "World Heritage in Russia" by the NGO "Transparent World".

We thank the Moscow Education Department for the financing of the Atlas publication, the UNESCO Moscow Office for Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Russian Federation (www.unesco.ru) for the information and moral support as well as the Natural Heritage Protection Fund for the information materials provided.

1. WORLD HERITAGE IN RUSSIA

1.1 World Heritage

The 27th General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted the Convention Concerning the Protection of the World Cultural and Natural Heritage (<http://whc.unesco.org>) on November 16, 1972 in Paris. This Convention entered into force on December 17, 1975. The number of the States Parties amounted 134 by May 1, 2004.

According to the Convention each State Party recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural

and natural heritage and situated on its territory, belongs primarily to that State.

In 1978 the first outstanding cultural and natural properties were included into the World Heritage List. These were four natural and eight cultural sites. By May 2005 the World Heritage List included 611 cultural, 154 natural and 23 mixed (natural and cultural) sites (<http://whc.unesco.org/en/list>).

1.2 World Heritage in Russia

Russia ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage on October 12, 1988 being the part of the USSR.

By May 2005 there are 8 natural and 13 cultural World Heritage sites in Russia.

In the near future several sites are to be added to the World Heritage List. They are Plutoran Plateau, the Lena River mouth, the Valdai Hills as well as the Kuril and Komandor Islands.

2. WORLD HERITAGE FROM SPACE

2.1 World Heritage – Looking from Space

Studies of the World Heritage sites from space **are rational** in case of their large area. The object's type (land, water body or buildings and constructions) is the second limiting factor.

Thus the Natural Heritage sites occupying as a rule a significant area head the list of observation objects.

The most important advantages of the satellite monitoring are the following:

1. The data cheapness compared to the information acquired directly by in-situ observations or by aerial photosurveying.
2. Simple all-year access to the data on hard-to-reach areas.
3. Data authenticity.
4. Possibility of routine monitoring of the natural and some cultural (especially cultural landscape) sites.

2.2 Atlas "World Heritage in Russia"

In 2004–2005 we prepared the Atlas "World Heritage in Russia" for publishing. The Atlas presents ten sites, including two transboundary ones (Fig. 1).



© NGO "Transparent World"

Figure 1. Curonian Spit. Transboundary property (Russian Federation / Lithuania)

These objects study and observation based on the Earth surface images from Space **is worthwhile**. They are as follows:

1. Cultural and Historical Ensemble of the Solovetsky Islands (1992)
2. Virgin Komi Forests (1995)
3. Lake Baikal (1996)
4. Volcanoes of Kamchatka (1996)
5. Golden Mountains of Altai (1998)
6. Western Caucasus (1999)
7. Curonian Spit (Russian Federation / Lithuania) (2000)
8. Central Sikhote-Alin (2001)
9. Uvs Nuur Basin (Russian Federation / Mongolia) (2003)
10. Natural System of Wrangel Island Reserve (2004).

The figure in brackets indicates the year of the site adding to the World Heritage List.

The Atlas consists of ten sheets of the A3 format. One side of each sheet presents a mid- or high-resolution image (Fig. 2). Mainly this is the MODIS (Terra) and ETM+ (Landsat) data. In addition on each sheet there is an insert with the most interesting fragment of this World Heritage site but of higher spatial resolution. Mainly

this is the data from the ETM+ (Landsat) and PAN&LISS (IRS) instruments.



© NGO "Transparent World"

Figure 2. Golden Mountains of Altai. Example of Atlas` page

Overleaf there is the black-and-white version of the same image with the names of the principal objects apparently seen in this image. In addition a brief annotation is given for each site together with the characteristics of the main data used.

2.3. Prospects for Using the Earth Remote Sensing Data for the World Heritage Study, Control and Monitoring

The above presented first experience of our organization reveals tremendous capacities of using the Earth space images for the World Heritage projects. Many organizations are interested in further development of these projects.

The next step in this trend development could be usage of the better resolution data as well as the increase of the number of sites (e.g. the territory of the CIS and Europe). Further development is seen as the monitoring of the World Heritage sites based on the satellite data.