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DETERMINATION OF THE HORIZONTAL AND VERTICAL MOVEMENT OF THE EARTH'S PLATES USING SPACE AND GEOPHYSICAL METHODS (IN THE EXAMPLE OF THE CITY OF TASHKENT)

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Annotation: The purpose of our work is to determine the horizontal and vertical displacements of the earth's plates using space images. Determining changes over a period of time by comparison.

Keys: Tectonic movements, divergent, convergent, lithosphere plates.

Improving satellites and launching them into space to gain more information is gaining momentum. We managed to observe the vertical and horizontal movements of the Earth's plates by processing in the Snap program the space images provided by the Sentinel-1B and Sentinel-1A satellites, which began production in 2014 and in 2016 and 2017. The Sentinel satellite offers HH or VV or dual HH + HV, VV + VH data products. It is with the help of the information provided by them that shifts are determined. Sentinel-1 is the first satellite of the European Space Agency's Copernicus program to carry a C-band synthetic aperture radar. This instrument has a spatial resolution of up to 5 m and a range of up to 410 km. The satellite moves in a Sun-synchronous, near-pole (98.18° inclination) orbit. The orbit has a repeat cycle of 12 days and completes 175 orbits per cycle. Single C-band Synthetic Aperture Radar (C-SAR). This instrument provides 1 dB radiometric accuracy with a center frequency of 5.405 GHz.

The data collected in C-SAR is intended to be continuous after the end of the previous mission (the Envisat mission). The movement of the Earth's plates refers to the Lithospheric plates. Lithospheric plates are responsible for many of the geological features seen on Earth's surface, such as mountains, volcanoes, and ocean ridges. There are several types of plate motion, including divergent, convergent, and variable plate boundaries.

At **divergent** plate boundaries, two plates move away from each other, creating a space between them filled with molten rock, which eventually solidifies to form a new crust. This process is responsible for the formation of oceanic ridges, such as the Mid-Atlantic Ridge, and it also leads to volcanic activity.

At **convergent** plate boundaries, two plates move toward each other and one plate subducts or slides under the other. This process causes volcanic activity as the subducting plate melts to form magma that rises to the surface. Convergent plate boundaries can cause mountain ranges to form when two continental plates collide.

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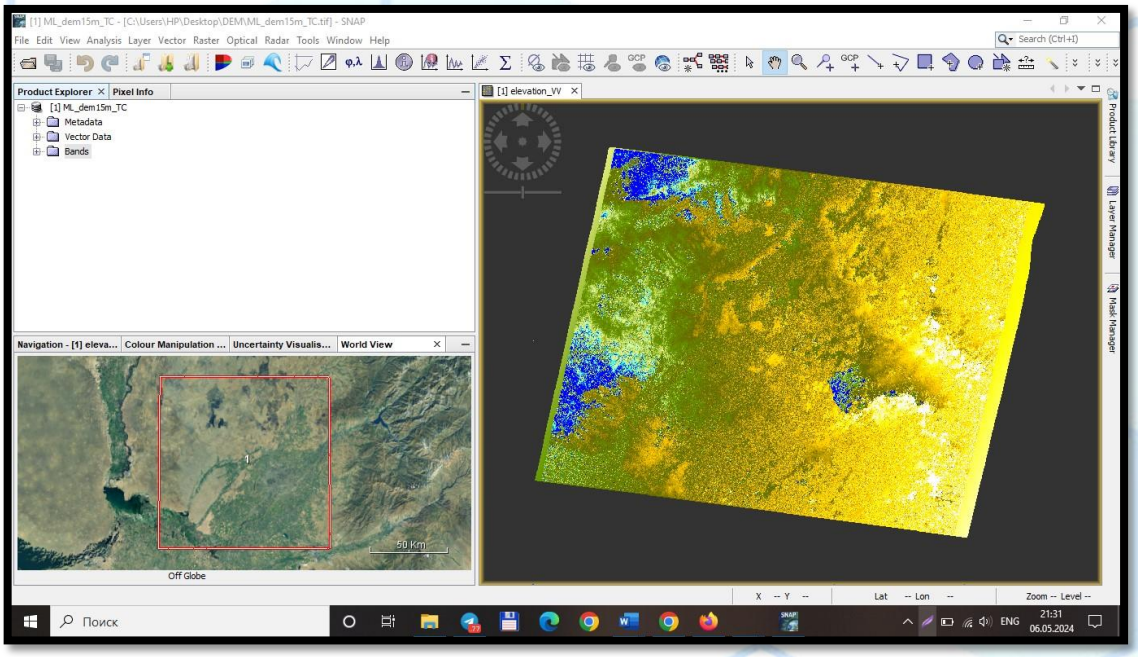
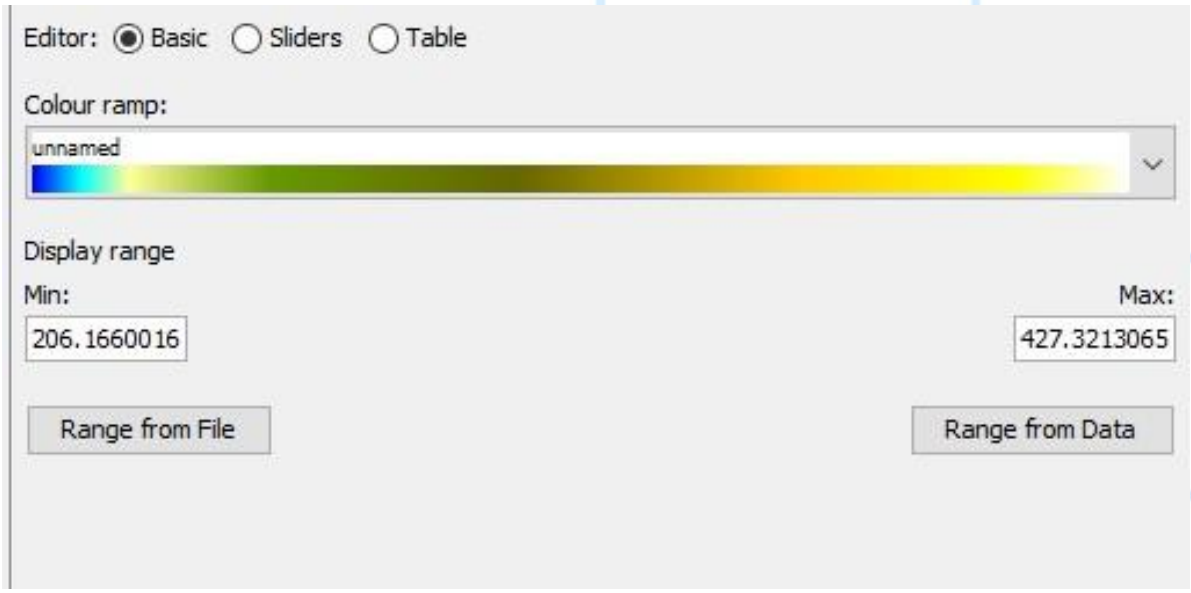
Transform plate boundaries occur when two plates cross each other horizontally. This results in faults, which are zones where the Earth's crust is broken and can move. Transform plate boundaries are responsible for earthquakes because the plates slide past each other, creating friction and tension.

We first download sentinel space images from asf.alaska to detect the motion of the earth's plates. We download and compare space images from 2018 and 2019.

Downloaded space images are uploaded to the Snap program in zip format and filter work is performed.The space image, after several times of processing, comes to the following state:



As you can see, we have an image with different colors. These colors represent the horizontal or vertical displacements of the lithosphere plates.



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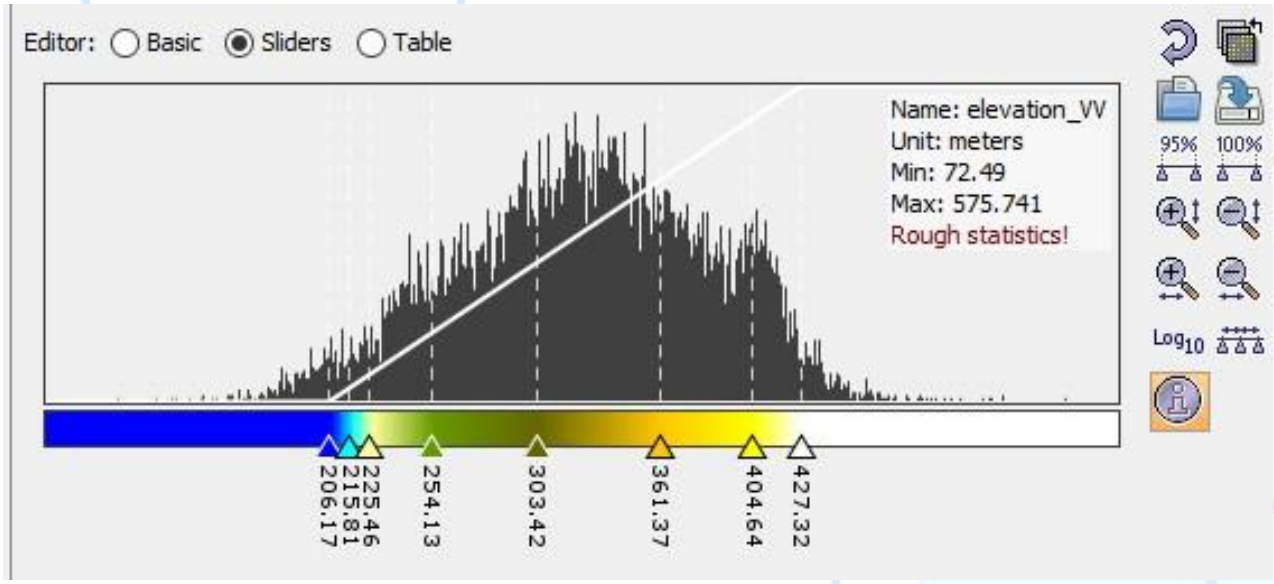
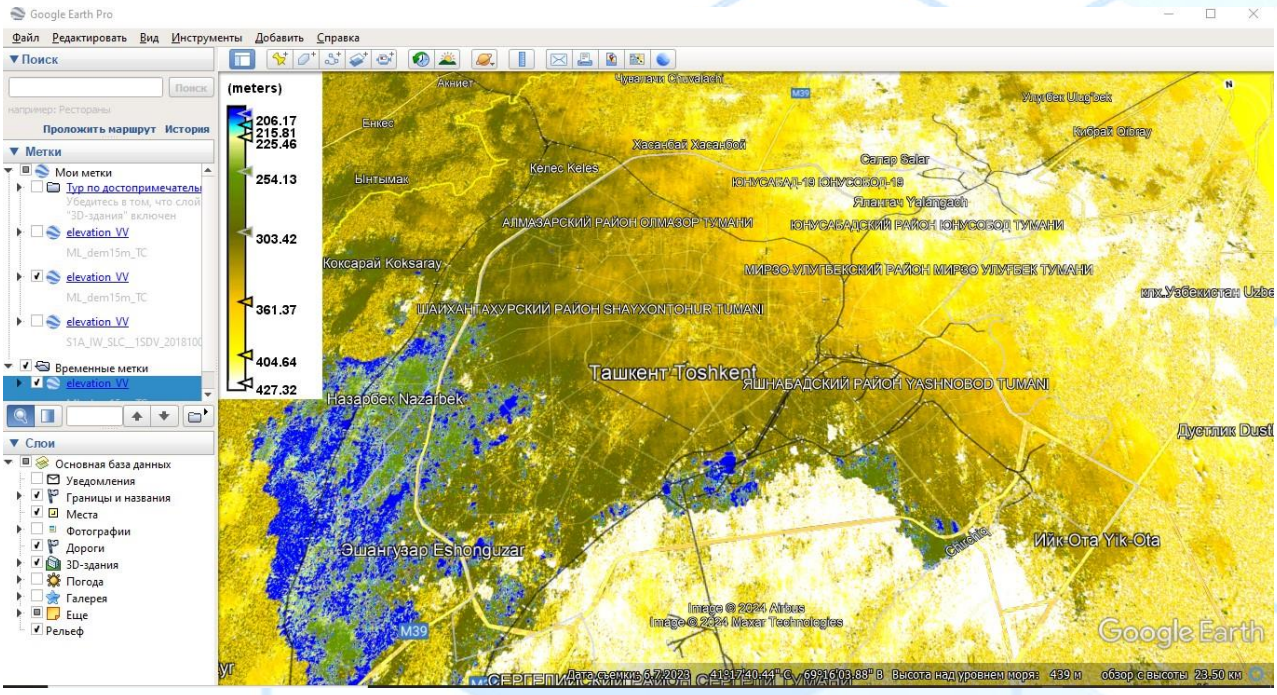
These colors are rated from blue to white as shown here. Blue is the area with the least amount of tectonic plate movement and white is the area with the most tectonic plate movement.

During the tectonic study of the city of Tashkent, we were sure that the minimum changes are 206,166 mm, and the maximum changes are 427,321 mm.

We can also show these in sliders graphics.



We will save the information obtained from the Snap program by step filtering the space image in kmz format and send it to the Google earth program for a more accurate view.



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In the Southern and Northern parts of the city of Tashkent, the largest movement of Lithospheric plates took place between **404.64** and **427.32** mm. The least tectonic movements occurred in the eastern and western parts of the city of Tashkent, their measured value is between **254.13** and **361.37** mm.

The least tectonic movements were observed in Kushbegi region, Chilonzor and Uchtepa districts of Tashkent city. The movement of the Earth's plates in these places occurred between **206.17** and **215.81** mm.

CONCLUSION

In conclusion, it is permissible to mention these. The movement of lithospheric plates is ensured by convection currents in the Earth's mantle, which are caused by the transfer of heat from the Earth's core to the Earth's surface. As hot material rises to the surface, it spreads and eventually cools, forming a downward flow towards the Earth's core. The cycle of uplift of hot material and subsidence of cold material acts like a conveyor belt that amplifies the movement of the lithospheric plates.

Plate movement has played an important role in shaping the Earth's surface and creating the features we see today. They also contributed to the development of life on Earth, as changes in Earth's climate and geography affected the distribution and diversity of species. The study of plate movements and their effects on the Earth is essential for understanding the history of the planet and for predicting future geological events.

LIST OF USED LITERATURE

1 Ibragimov R.S. O‘rta Tyan-Shan seymogen zonalari// Toshkent “FAN” nashriyoti. 1978 y.

2. Abdullabekov K.N., Berdialiev Ye., Maksulhdov S.X. Elektricheskie i magnitnye predvestniki zemletryaseniy. Tashkent, FAN. 1983. 134 s.

3. Захаров А.И., Яковлев О.И., Смирнов В.М. Спутниковый мониторинг Земли: радиолокационное зондирование поверхности. - М.: Либроком, 2012. - 248 с.

4. Yarmuxamedov A.R. Morfostruktura Sredinnogo Tyan-Shanya i ee svyaz s seysmichnostyu. – T.: Fan, 1988. – 163 s.

5. Abdullabekov Q.N., Yusupov V.R. O‘zbekistonda yer magnit maydonining asriy o‘zgarishlari // ToshDTU xabarlari. – T., 2013. – № 2. – B. 151-154.

6. Abdullabekov K.N., Maksudov S.X., Muminov M.Yu., Tuychiev A.I. Geomagnitnye issledovaniya na territoriyax texnogennыx ob’ektov Uzbekistana. Pyatыy Mejdunarodnыy simpozium “Sovremennye problemy geodinamiki i geoekologii vnutrikontinentalnyx orogena”. Bishkek, 19-24 iyunya 2011 g. S.5-8.

7. Hariharan P. Basics of Interferometry. Second Edition. - Amsterdam: Elsevier Academic Press, 2007.

8. Bunch, Bryan H., Alexander Hellemans The history of science and technology // Houghton Mifflin Harcourt. - 2004. - 695 p.

9. . Richards J.A. Remote Sensing with Imaging Radar. - Berlin-Heidelberg: Springer-Verlag, 2009. - 361 p.