2023-2024

NamazuContest 2023-2024
Episode 1

Enigmas announced September the 15th, 2023; answers before October the 10th, 2023 to
➢ *namazu@geoazur.unice.fr*

Part 1. Exploring InSight.

Level of difficulty

The goal of this first part is to explore the InSight mission which allowed the exploration of the planet Mars and also allowed us to have fun with scientific challenges since 2018.

For each of the following questions, find the correct answer.

Question 1. What are the goals of the InSight mission?

- To study the internal structure of Mars
- To study the distance between the Earth and Mars
- To study the movement of the Moon with respect to Mars

Question 2. Between the Earth and Mars, which planet has a smaller diameter?

- The Earth
- Mars
- They have the same diameter

Question 3. What is the landing site of the InSight mission?

- Elysium Planitia
- Mont Olympe
- Tharsis Montes
- Uranius Patera

For help:
➢ Edu'InSight (unice.fr)

Question 4. What is the distance between the Earth and Mars?

- 76 thousands of kilometers
- 56 millions of kilometers
- It varies in time
- 400 millions of kilometers

Question 5. The planet Mars:

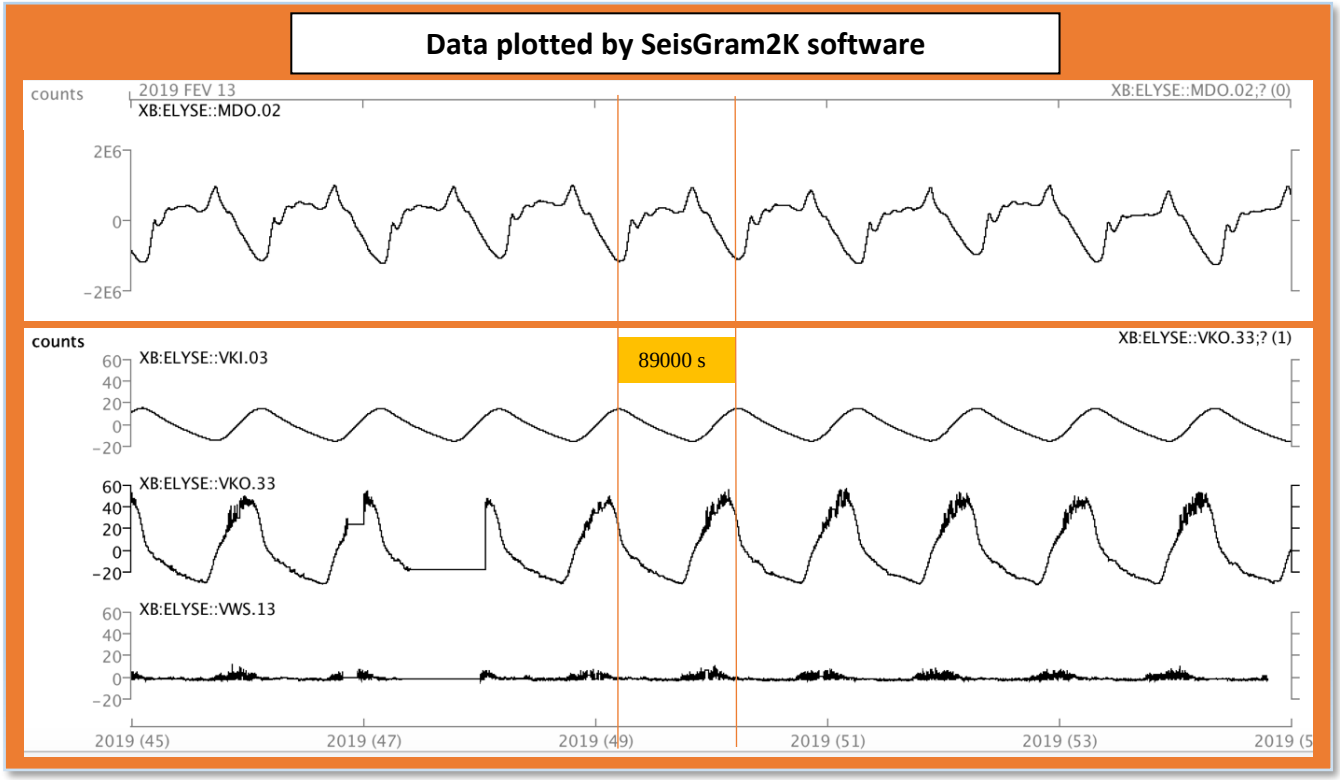
- Has no natural satellites
- Has as the Earth one natural satellite
- Has two natural satellites
- Has as Jupiter four natural satellites

Question 6. The landing on Mars faced difficulties because:

- There ris a high amount of clouds and acid rain
- There is very little atmosphere
- There are very violent wind storms
- There is as Venus a very dense atmosphere Vénus

Question 7. Since the InSight lander deployed its sensors, several parameters were registered as the atmospheric pressure *(MDO.2 sensor)*, the external temperature of the air located under the protective shield of the seismometer *(VKI.03 sensor)*, the external temperature *(VKO.33 sensor)* and the wind speed *(VWS.13 sensor).*

The following figure shows the registered data that we received from Mars between the 14th and the 23rd of February 2019, therefore 10 Earth days (from the 46th day to the 55th day):



- A day on Mars is shorter than a day on Earth
- A day on Mars is longer than a day on Earth
- A day on Mars is two times longer than a day on Earth
- An Earth day lasts as long as a Martian day

Question 8. From the data, what is the most probable sequence of events:

- The Sun rises on Mars, the external temperature increases, causing a thermal agitation of the air, followed by a slight increase of the temperature under the shield and a decrease of the pressure when the thermal agitation is at a maximum.

- The Sun rises on Mars, the winds also rise (thermal agitation) causing an increase of the atmospheric pressure and an increase of the external temperature as well as under the shield.
- When the Sun sets on Mars, the temperature decreases under the shield as well as on the exterior, the pressure decreases and the winds stop.
- The evolution of the atmospheric pressure on Mars is not at all synchronized with the Martian days, just like the behaviour of the winds and the evolution of the external temperature.

A help to resolve this question:
➢ Topic Data (oca.eu)

Question 9. The InSight lander was deposited on Mars on the 26th of November, 2018. Since its arrival on the planet, we count the time of the mission in Earth and Martian days. A Martian day is called a martian sol.

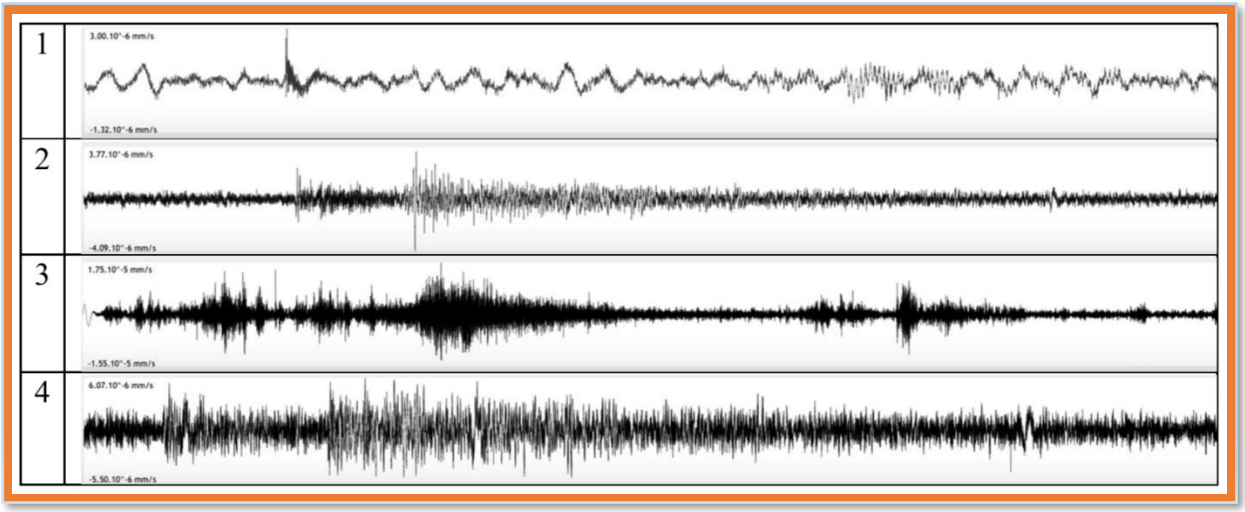
The seismometer has registered its first seism (called marsquake) the 7th of April 2019, which is :

- The 132nd day of the mission equivalent to 132 martian sols
- The 132nd day of the mission, equivalent to 136 martian sols
- The 132nd day of the mission, equivalent to 128 martian sols
- The 96th day of the mission, equivalent to 132 martian sols

A help to resolve this question:
➢ https://insight.oca.eu/fr/data-insight

Question 10. A historic moment on Mars: the seismometer registered its first marsquake the 7/04/2019.

Which seismogram corresponds to this day?



A help to resolve this question :

- Edu'InSight (unice.fr)

Question 11. The main sensor of the mission is the seismometer SEIS. Since its deployment on Mars, it was able to register the passage of seismic waves caused by marsquakes. The seismometer (SEIS), well perfected, is capable of registering the passage of these waves propagating on the surface or in the depth of the red planet.

The seismic waves that propagate on the surface of the globe:

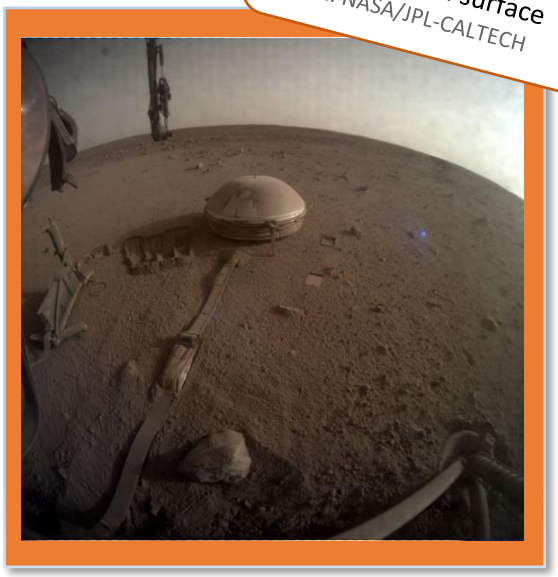
- Are called P waves and S waves
- Move slower than Se déplacent moins vite que dans les zones profondes du globe
- Go around the planet Mars in a few minutes
- Go around the planet Earth faster than on Mars

Part II. InSight and you on a photo.

Here are two photos of the InSIght mission on Mars.

A photo of the robotic arm of the lander with SEIS before its installation.
Credit: NASA/JPL-CALTECH,

Photo of SEIS after its deposit on the martian surface
Credit: NASA/JPL-CALTECH



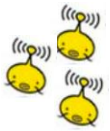
It's your turn!

Take a photo of your club, class or group (with a photo taken by InSight, visible in your hands or on a video projector behind you). The photograph may be of the martian lanscape taken bu InSight.

Photo to be sent to:

- **insight@geoazur.unice.fr**

Part III. Construction of a seismometer.



It is possibly a classic question, nonetheless it is ideal to start a year with NAMAZU…

<u>JUNIOR level:</u>
By getting inspired with models invented throughout History and/or of your own ingenuity, **create a seismometer capable of recording vertical movements of the ground.**

<u>EXPERT level:</u>
By getting inspired with models invented throughout History and/or of your own ingenuity, **create a seismometer capable of recording vertical and horizontal movements of the ground.**

To answer this question, you will need to film your seismometer in action and explain how it works. The video must be uploaded to a file transfer for which you provide the link.

Have fun and until Novembre for the second challenge !