

Climate Detectives 25-26

Liceo Scientifico e delle Scienze Umane S. Cantone

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Classi coinvolte : 2dsa e 3dsa

Investigation details

In which language do you plan to submit your project? *

English

Project title *

Land Subsidence and Climate changes a strong relationship

Project topic *

Subsidence , Volturno- Regi lagni coastal plain, Pomigliano d'arco , satellite image

Research question *

What is the correlation between subsidence and climatic change? The students try to give us an answer.

Identify local climate or environmental problem

The students identified as real problems the topics of the correlation between climate change and the geomorphological changes (subsidence) of the most important area of Regi lagni of Pomigliano d'arco. The study focuses on the correlation between the rural change and the salt intrusion process , the study was performed with laboratory data end satellite data from Copernicus .

Describe shortly your identified local environmental problem and what kind of data you will use

The students work on Pomigliano d'Arco, small town located in The Regi Lagni area, on the crucial Volturno alluvial Coastal Plain , which are on the front lines of climate change in Campania, facing combined threats from rising sea levels, land subsidence, altered water cycles, and increased flooding, and consequent changing in biodiversity. The aim of this project is to evaluate the role of geomorphological changes and climatic change and ist consequences. In particular student start the study by collected hisorical data of our area with Historical maps than the students work on Copernicus observation (sentinel 1) and analysing the data. They compare , successively, with collected data of our territory sampling of soli try to search transformation of soil under pressure, aspects that interact with the risk of subsidence. Moreover the students are analysing the collected data by sampling of marine waters to evaluate the phenomenon of salt wedge intrusion, which is influenced by changing of natural factors influencing the salt intrusion process (thermal expansion of water, increase in evapotranspiration, increase in precipitation).

Investigation highlights

The investigation focused on the Volturno River plain, an area particularly vulnerable to land subsidence due to both natural processes and human activities. Using satellite data provided by the European Space Agency, specifically Sentinel-1 and Sentinel-2, the students applied remote sensing techniques to monitor ground deformation over time. Through the use of the SNAP platform, they performed interferometric analysis by comparing the phase of signals from different satellite acquisitions, allowing them to detect even small variations in ground elevation.

Main Results

Subsidence impacts infrastructure, humans, and the environment, and as climate change intensifies the terrestrial hydrologic cycle and severity of climate extremes, the interplay among extremes infrastructure, humans, and the environment. In this project, the students investigate the Volturno River plain and its variety of subsidence. Using remote sensing data and SNAP software, analyse the image and by comparing the phase of the signal between two different acquisitions over time, distance changes (deformations) between the satellite and the ground can be calculated. The interdisciplinary study also focuses on the correlation of this change due to the variation in the morphology of the regi lagni created to collect rainwater. The subsidence information over Volturno plain and its surroundings using Copernicus Sentinel-1 data and open source tools show a different morphological soil . The students worked for the first time on this project trying to develop an automatic processing chain for monitoring ground deformation using the European Space Agency (ESA) platform (SNAP). Based on the Sentinel 2 satellite image subsequently analyzed by SNAP, it was demonstrated that the Campania coastal plains are affected by strong subsidence. As can be seen from the images analyzed where the profile plot graphs show a decrease in soil thickness.

Action taken to make a difference

To address the growing problem of land subsidence in the Volturno river plain, an important action is the development of a continuous and automated ground deformation monitoring system using satellite data from the European Space Agency and open source tools such as SNAP. Integrating Sentinel-1 and Sentinel-2 remote sensing data. in this regard, "citizen science" students could transform themselves into researchers and collaborate with local authorities by identifying high-risk land areas. This information can support better land use planning, improve water management in the Regi Lagni system and reduce risks for infrastructure and communities. Furthermore, raising awareness among local stakeholders and promoting sustainable use of groundwater can help mitigate the causes of subsidence. Together, these actions help protect the environment, increase resilience to climate change and ensure safer living conditions for future generations.