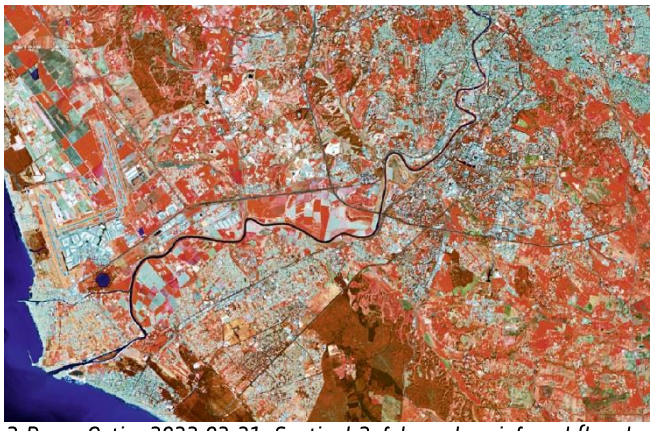
2 Rome-Ostia, 2022-03-21, Sentinel-2, true-colour representation (bands 4-3-2).



3 Rome-Ostia, 2022-03-21, Sentinel-2, false colour infrared (bands 8-4-3).

4 Rome-Ostia, 2022-03-21, Sentinel-2, urban false infrared (bands 12-11-4).

From Data to Images

Most Earth observation satellites do not deliver standard colour images. They rather acquire series of greyscale images in different parts of the electromagnetic spectrum. These **image bands** are used for scientific evaluations, and, similar to the procedures applied in printing and display technology, they are combined to produce colour images of various types for a wealth of different visualisation purposes.

Different from usual photography, the greyscale image bands are combined in various ways. Depending on the application, images are produced in natural colours (true-colour image), false-colour infrared images and other band combinations.

True colours and False-colour infrared Images

While true colour images are used to show the Earth "as it is" (i.e. as it would appear to the human eye) for mapping and illustration purposes, other representations are used to highlight specific properties of the displayed area.

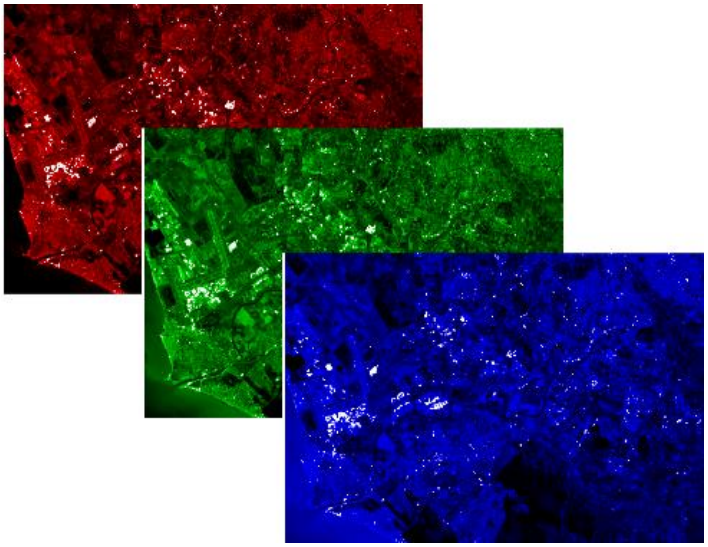
Important additional information is contained especially in the infrared image bands. This information is used e.g. to highlight and to analyse properties of plants, because the chlorophyll contained in the leaves reflects the infrared part of the sunlight very well. This makes this data a valuable information source for applications in agriculture and nature protection.

Other uses for false-colour infrared representations using other infrared bands include analyses of fires and volcanic activities, and of properties of urban spaces.

Exercises

- Look at the visualisations of the Sentinel-2 data as “true-colour”, “false colour infrared”, and, “urban false colour infrared”.
- Describe similarities and differences.
- Focus on the sea surface in the lower right of the images. Describe the properties in the different visualisations.
- Focus on the forest area in the lower centre of the images. Which visualisation provides the clearest view of different forest types? Think about the differences in the colour of young leaves and the needles of a fir.
- For advanced readers: focus on the built-up areas in the upper right corners, which are the southwestern parts of Rome. Which of the visualisations is the best to separate built-up areas from other land cover classes such as cropland?

Additional Material



Schematic presentation of the combination of image bands.

Links and Sources

- https://www.esa.int/Education/1._Introduction - Earth observation course for secondary schools.