

The currently observed dynamic changes in land use and land cover significantly affect biodiversity, food security and climate change. The increasing availability of satellite imagery in recent years has allowed to study these changes over large areas for the last 40 years, since the improvement of sensors in the Earth observation Landsat program. Reaching into a more distant past, however, is still possible. It can be done using the images of the CORONA spy mission (1960s and 1970s) that were recently made available, but due to the specificity of the imagery it is not an easy task. The problem is both the geometric distortions of CORONA images, the way they were recorded and their thematic consistency with contemporary spatial European or global land use data. Recent years have brought a lot of this type of data, freely available for instance via European Copernicus programme web portal; however, comprehensive research on their quality and applicability in land use change research is still missing.

The aim of the project is to develop optimal procedures of CORONA imagery processing to receive land use and land cover information, and to assess how this information can be compared to contemporary data presenting spatial land use and land cover patterns. The research will be carried out in selected regions of Poland. Main emphasis will be on land use and land cover changes related to agricultural land abandonment and a gradual increase in forest area. Such changes occur in Poland in many regions and have intensified after 1990.

The research will include:

- preparation of CORONA satellite imagery for studied regions, including geometric correction,
- mapping land use and land cover based on CORONA imagery with various methods, including object-oriented image analysis and machine learning using auxiliary cartographic sources,
- assessing the usefulness of contemporary global land use and land cover data in the context of forest cover change research, and identification of products that are most consistent thematically with the information from CORONA images,
- analysis of forest cover changes resulting from agricultural land abandonment in selected regions in Poland, over the last 60 years.

The conclusions resulting from the work will be universal in nature, as CORONA imagery, similarly to contemporary data, are available for various regions of the world. Therefore, the results of the project may contribute to a better understanding of the trajectory of land use and land cover change at the global scale. Research will also provide a better understanding of the dynamics and nature of processes that can contribute to preventing negative effects of biodiversity loss and climate change.