

Citizen Science for Big Earth Observation Data Analytics in Land Use and Land Cover Change Monitoring: From Scope to Future Directions

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Land use and cover changes (LUCC) monitoring is a basic need for understanding sociopolitical, ethical and economic aspects of local to global size. A bunch of complex techniques, auxiliary data sets and remote sensing tools are efficient mechanisms to track LUCC over large areas. This combination is a time-consuming task considering the recent unthinkable numbers of satellite imagery provided by space agencies. In consequence, scientists lack of ways to organize thousands of downloaded files and analyze the high variability of their spectral and spatial attributes. The unavailability of an adequate technological infrastructure have moved studies toward a new architecture of analysis called big Earth Observation (EO) data analytics. This is the ideal architecture to develop and adapt methods with minimal reworking for generating and sharing LUCC results in a collaborative and replicable manner. That further includes managing diverse satellite specification and the climatic conditions interferer. For instance, tropical regions such as those found in Amazon rainforest has long periods of clouds. These blanks do not allow environmental programs to judge forest deforestation or degradation. The influence of the global warming affect the measures of crop areas too. Since abrupt changes occur on the phenological cycle of culture stages. These issues attached to thousands of kilometers of distinct satellite imagery hamper the scientist's work. Scientists seek an automated and generalized method to mitigate the burden on generating LUCC classification maps. Yet it is hard to achieve accurate and efficient results without extensive human supervision. Human visual image interpretation and collection of in situ data are still the simplest and qualitative methods. A manual approach allows non-specialists to collaborate with LUCC information through field-based and online contributions. The challenge here is how to promote a more active scientific citizenship approach with big EO data analytics for LUCC monitoring. With that in mind, we aim to discuss the scope and future directions on how to collect, organize, incorporate and improve society's judgements (lots of citizens) into generated automated LUCC maps. Our work focus on the following main contribution: summarizing how existing approaches that allow citizens to contribute with up-to-date and detail LUCC information and assess existing ones might mitigate the required exhaustive experimentations for automated generating LUCC maps. That allowing the analysis of experts and non-experts to produce their results based on the society's judgements and their previous local experience. Thus, we aim to stimulate them to embed their data into operational big EO data analytics applications.