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Integration of multi-temporal Earth Observation data for brownfields inventory update

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Closure of industrial facilities is an inevitable part of the cycle of land use. Due to its rich industrial past, Wallonia exhibits relics of its former activities in the shape of brownfield sites. These comprehend sites previously dedicated to economic activity ranging from post offices to heavy steel industries. They are generally located in the inner city and thus provide a good opportunity for urban renewal. Following population growth and transport congestion, derelict sites appear to be a perfect answer for urban regeneration. Their identification and rehabilitation have then become a priority for urban planning. European Commission under the Soil Thematic Strategy asked each Member State to compile an inventory of such sites. The inventory wants to integrate a sustainable urban development plan by ending with land use trends such as urban sprawl and land abandoned. To address this need, a new methodology has been developed for Walloon's authorities. It integrates Earth Observation data to support photo-interpretation for updating the inventory of brownfield sites. This methodology makes a use of multi-temporal EO-data and GIS technology to quantify changes related to the rehabilitation of the sites. It is carried out by the integration of four different sources of data: Sentinel-2, Orthophotos, Pléiades and LiDAR data. Spectral vegetation and soil indices have been used to emphasise specific aspects of land cover by the virtue of their spectral signatures. They enable to draw comparison between values of index on different dates and therefore the detection of areas of change. By identifying areas potentially rehabilitated, this method serves to guide field reconnaissance efforts and helps to bring the sites back to a cycle of urban development. Spatially-explicit depiction of areas of change is critical for monitoring the evolution of brownfield sites in Wallonia. It will help to mitigate the sealing of soils and prevent the conversion of green areas through the re-use of already built-up areas.