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A concept for extraction of habitat features from laser scanning and hypersprectral imaging for evaluation of Natura 2000 sites - the ChangeHabitats2 project approach

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The goal of the ChangeHabitats2 project is the development of cost- and time-efficient habitat assessment strategies by employing effective field work techniques supported by modern airborne remote sensing methods, i.e. hyperspectral imagery and laser scanning (LiDAR).
An essential task of the project is the design of a novel field work technique that on the one hand fulfills the reporting requirements of the Flora-Fauna-Habitat (FFH-) directive and on the other hand serves as a reference for the aerial data analysis. Correlations between parameters derived from remotely sensed data and terrestrial field measurements shall be exploited in order to create half- or fully-automated methods for the extraction of relevant Natura2000 habitat parameters.
As a result of these efforts a comprehensive conceptual model has been developed for extraction and integration of Natura 2000 relevant geospatial data. This scheme is an attempt to integrate various activities within Change-Habitats2 project defining pathways of development, as well as encompassing existing data processing chains, theoretical approaches and field work.
The conceptual model includes definition of processing levels (similar to those existing in remote sensing), whereas these levels cover the range from the raw data to the extracted habitat feature. For instance, the amount of dead wood (standing or lying on the surface) is an important evaluation criterion for the habitat. The tree trunks lying on the ground surface typically can be extracted from the LiDAR point cloud, and the amount of wood can be estimated accordingly. The final result will be considered as a habitat feature derived from laser scanning data. Furthermore, we are also interested not only in the determination of the specific habitat feature, but also in the detection of its variations (especially in deterioration). In this approach the variation of this important habitat feature is considered to be a differential habitat feature, that can be immediately used in the evaluation of the Natura 2000 sites.
The goal of the project is the identification of many potential habitat features that can be extracted or implied from remotely sensed data, and the development of processing chains to provide data that can be used in the everyday field work of ecological site assessment.

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