

Using deep learning to assess coastal habitat dynamics

Department: Physical Geography

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Project description

Coastal landscapes are dynamic environments that consist of shifting mosaics of specific habitat types. In coastal dunes we can distinguish the morphologically active yellow dunes, which are dominated by dune building species, the inactive grey dunes covered by grasslands or shrubs, and coastal forests that can consist of deciduous or pine trees. Every habitat provides its own coastal services (e.g., biodiversity accommodation, carbon storage, sediment transport, erosion control) which is partly controlled by habitat size (area) and landscape structure (habitat patch area distribution and connectivity). However, in these dynamic environments vegetation structure and identity can shift rapidly due to changes in for instance sediment exchange, nutrient deposition or grazing pressure which affects the overall coastal landscape functioning. In this project, **you will apply a deep learning model to look for changes in habitat structure in coastal landscapes**. This model is currently being trained and evaluated by Eva (PhD student at NIOZ) with the use of an extensive field dataset of 541 plots recorded in the Dutch coastal dunes.

You will use this deep learning model to follow habitat development through time. You are expected to increase the current training dataset through manual image classification and there will be the possibility of additional field data collection or field visits. Additionally, you are expected to assess the accuracy of the DL method, to assist in method development to automatically track temporal changes, and – naturally – we encourage you to develop your own research ideas related to image classification methods or coastal dynamics.

Job requirements

We expect you to be enthusiastic about applying remote sensing and machine-learning techniques to understand coastal dynamics. However, no prior knowledge of coastal dynamics and ecology is needed. Additionally, we don't expect you to have specific experience in machine learning methods, but experience in programming (preferably in Python or Matlab) is required. Depending on your interest we can include some field data acquisition.