OpenLandMap.org — Global Complete Environmental Layers

A system for global soil and vegetation mapping using legacy field observations and Machine Learning

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OpenLandMap.org in a nutshell

The OpenGeoHub foundation provides Geoserver-based hosting and data science services to produce and share the most up-to-date, fully documented (potentially to the level of full reproducibility) data sets on the actual and potential status of multiple environmental measures. We use state-of-the-art Machine Learning to produce global maps of soil properties/classes (Fig. 1), relief, geology, land cover/use/degradation, climate, current and potential vegetation, through a simple web-mapping interface allowing for interactive queries and overlays.

This is a genuine Open Land Data and Services system (an *"OpenStreetMap-type"* system for environmental data) build 100% on Open Source software Geoserver, Geonode, GDAL, R (machine learning and plumbeR packages).

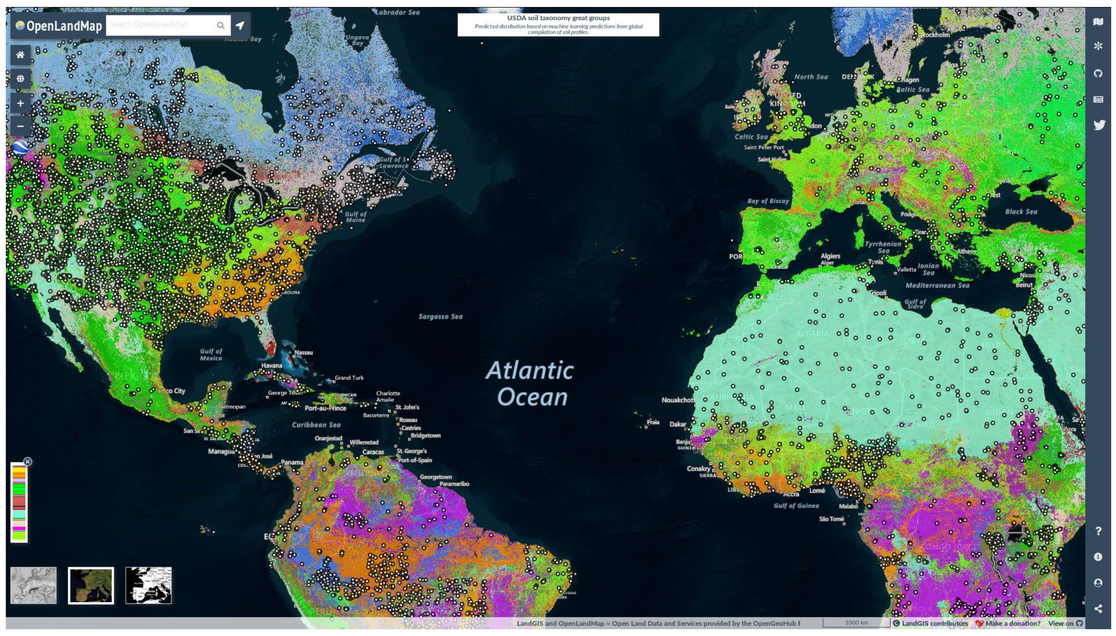

Fig. 1: LandGIS interface showing predicted global distribution of USDA great groups (soil types) based on a global compilation of soil profiles. Data available for download at doi: 10.5281/zenodo.1476844.

Using the power of Machine Learning to add value to existing legacy data

With LandGIS / OpenLandMap.org, we have shown that new, value-added, information can be produced immediately and affordably using *"old reference legacy data"*. We have demonstrated both the fundamental technology and new knowledge transfer opportunities (from data-rich countries to data-poor countries; Fig. 2), which we believe is a win-win scenario. We typically release all code used to generate OpenLandMap layers as open source, allowing full replicability of state-of-the-art spatial analytics by anyone.

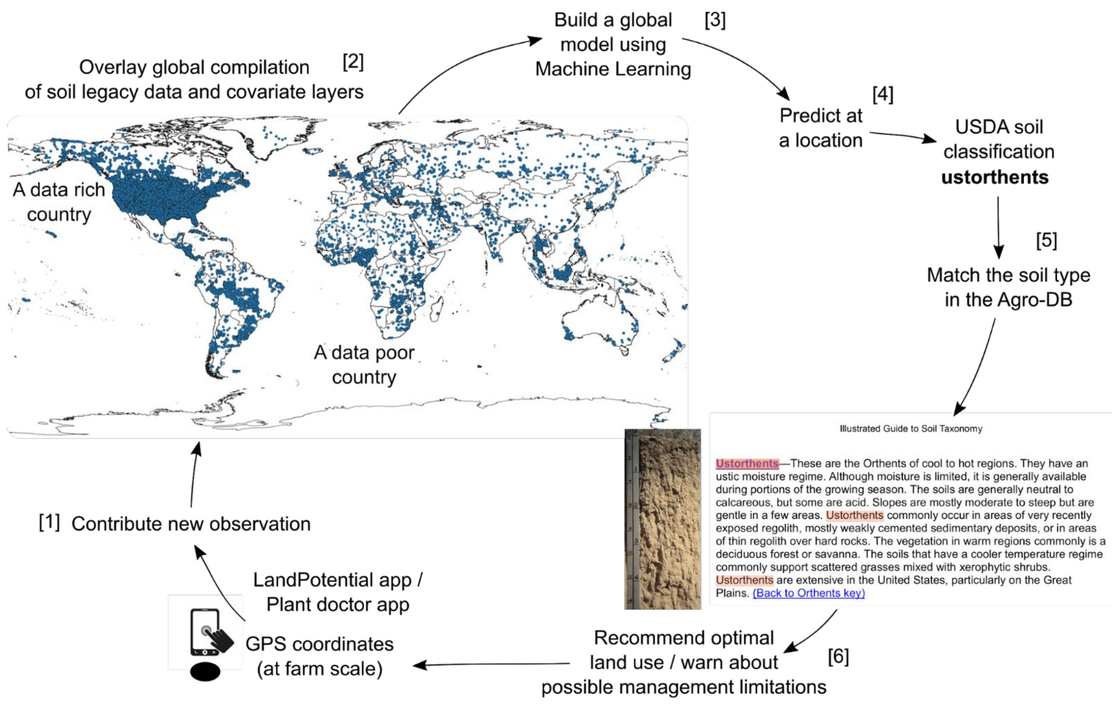

Fig. 2: Example of a general workflow of how OpenLandMap can be used to recommend optimal soil use practices at a farm scale based on accurately predicting the soil type (USDA soil great groups). This is a circular process where with each new contribution (training points) we can produce increasingly more detailed / more accurate soil maps.

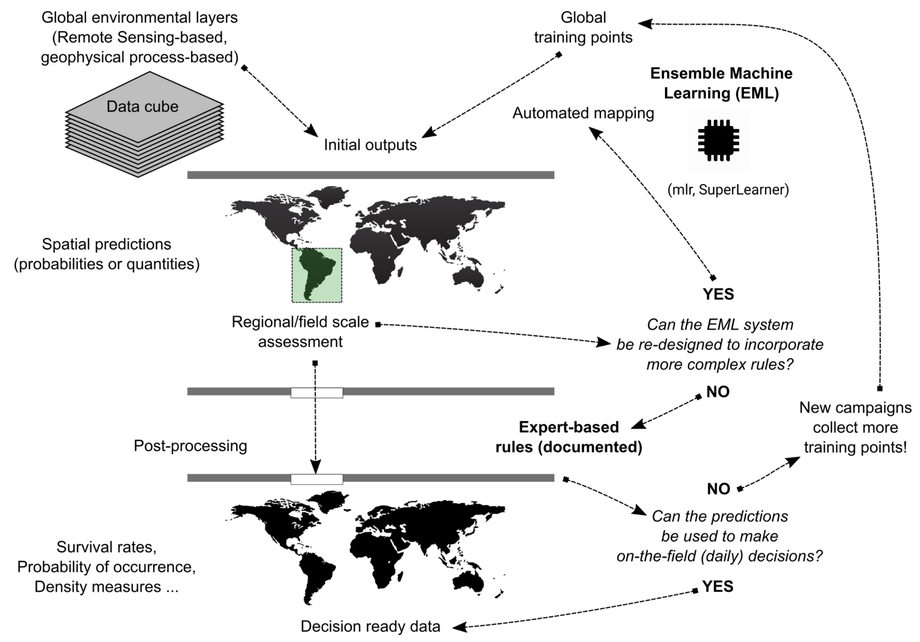

Fig. 3: The proposed general framework to combine Machine Learning with expert groups to improve the final predictions / to reach decision-ready data levels.

Accessing OpenLandMap.org data

- To download raw data (GeoTIFFs) use unique DOI's generated through Zenodo.org.
- All layers are also available via the OpenGeoHub Geonode at https://maps.opengeohub.org.
- REST API at https://landgisapi.opengeohub.org provides live access to layers through a programing environment. This allows you to query values of layers at point locations (up to 50 points in parallel) and can significantly speed up access to data.

https://github.com/Envirometrix/LandGISmaps

OpenLandMap.org

Created and maintained by:

- Data sets and functionality: **OpenGeoHub & EnvirometriX Ltd**, Wageningen, the Netherlands,
- App development and webservices: **GILab D.O.O.**, Beograd-Palilula, Serbia,

OpenGeoHub
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