

# The ECOPOTENTIAL On-Line Data Services

## Key messages

Automated execution of models or modules by the users is enabled by the ECOPOTENTIAL Virtual Lab.

Users may input existing or new data and activate the online services.

Products can be downloaded in commonly used formats.



### WaterMasks & LAST-EBD

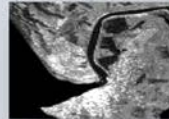
Generate inundation maps with Sentinel-2/Landsat data

inundated  
non-inundated



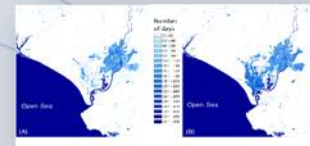
### Speckle Removal

Improved speckle suppression of SAR images to be used as input data



### HydroMap & LAST-EBD

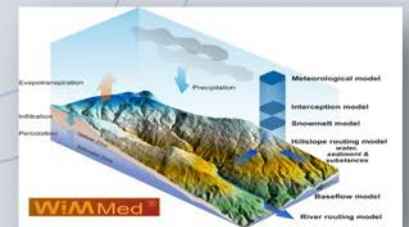
Estimate hydroperiod



Support the assessment of the hydrological cycle

### WiMMed

Calculate aquifer recharge & surface runoff



WiMMed service generates maps for two ecosystem services related to hydrology

(aquifer recharge & surface runoff). Applied to Sierra Nevada (Spain) Protected Area (PA) at 90x90m for 2007-2008.

WaterMasks estimates the free open surface water extent of an area. The service applies a novel automatic thresholding methodology for separating water class areas from non-water class areas from a single Sentinel-2. Applied to Doñana (Spain), Camargue (France) PAs.

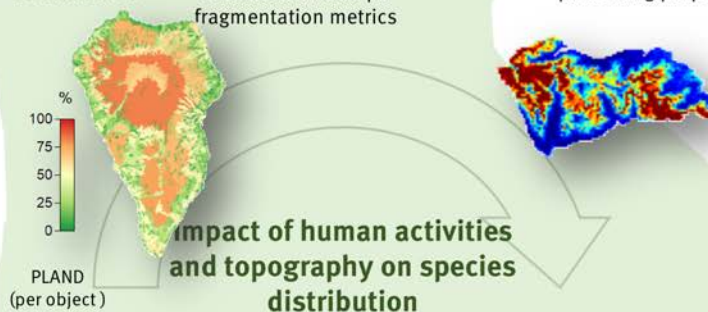
LAST-EBD generates a series of thematic raster files from a Landsat scene and more specifically the Normalized Difference Vegetation Index (NDVI), water turbidity, and flood mask. Generated flood masks are finally used for the hydroperiod estimation of the respective area. Applied to Doñana (Spain) PA.

HydroMap calculates the hydroperiod of a given area for a desired time-period from a series of Sentinel-2 satellite-based water masks; deriving the length of time the area remains flooded throughout a defined period. Applied to Doñana (Spain), Camargue (France) PAs.

Speckle Removal suppresses speckle in the SAR Sentinel-1 product, while maintaining the texture structure, by using guided image filtering with a good edge-preserving property.

### LandMetrics

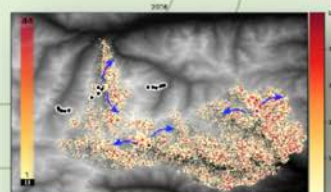
Calculate landscape fragmentation metrics



Impact of human activities and topography on species distribution

### MountainMetapop

Impact of landscape topography on species distribution



LandMetrics calculates numerous landscape measures used as indicators of fragmentation and/or connectivity of land cover or habitat classes in a selected study area: Percentage of landscape, Total class area, Patch density, Mean patch size, Shape index distribution, Effective mesh size, Area-weighted mean patch fractal dimension. Applied to Sierra Nevada (Spain), Samaria (Greece), Montado (Portugal), Lake Prespa (North Macedonia), La Palma (Spain), Curonian Lagoon (Lithuania).

MountainMetapop studies the impact of landscape topography on species distribution under climate warming by simulating the average presence of a species with certain traits in a landscape, based on spatial patch occupancy model. Applied to Gran Paradiso National Park (Italy).

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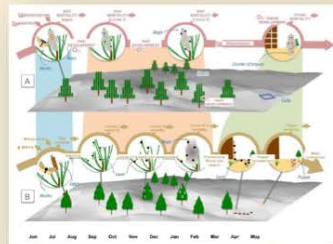
<https://vlab.geodab.org/>

Selected models and other model supportive workflows were transformed into operational online data services and integrated into the ECOPOTENTIAL Virtual Laboratory (VL). Services may be utilized either stand-alone or as workflow components to generate input for further models or decision support chains.



**INSTAR** provides a deeper understanding of the population dynamics of *Thaumetopoea pityocampa* forest pest and forecasts the probability of occurrence and intensity of the pest outbreaks at landscape scale, under different climate and land use scenarios. Applied to Sierra Nevada (Spain).

## INSTAR



Estimate population dynamics of *Thaumetopoea pityocampa* forest pest.

## COINS

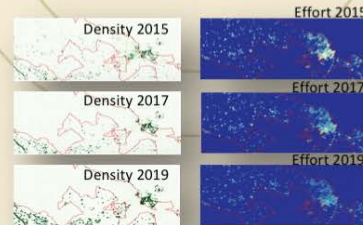
Calculate optimal spatiotemporal Control of INvasive Species (tested for *Ailanthus Altissima* species).

## Understanding dynamics of species distribution: human activities in support of nature

## IRIS-SDM & EO-SDM



Predict habitat suitability & test the applicability of established species distribution models.



**IRIS-SDM** - 'Infrastructure for Running, Inspecting and Summarizing Species Distribution Models' predicts spatial distribution of suitable habitat conditions (tested with *Iris boissier*) derived from Species Distribution Models for narrowly distributed species based on satellite-derived Ecosystem Functional Attributes. Applied to Peneda-Gerês National Park (Portugal).

**EO-SDM** stands for 'Ensemble modelling of species distributions using Earth observation data' and tests the applicability of established species distribution modelling algorithms (applied for rove beetles) in combination with remote sensing data applied to Gran Paradiso National Park (Italy).

**COINS** calculates the optimal spatiotemporal Control of INvasive Species in natural protected areas based on a routine that solves the control problem, by searching for optimal effort allocation, which minimizes invasive species density in time & space. Applied to Murgia Alta (Italy) for *Ailanthus Altissima* plant species.

**PhenologyMetrics** generates phenology related layers relying on NDVI time series covering a vegetation growth period. These layers include: Day at which greenup takes place; Day at which senescence takes place; Day with highest NDVI value (peak); Per pixel total number of the phenological cycles detected within the set time period. Applied to Doñana (Spain).



**PhenologyChanges** calculates the abrupt trend changes in the vegetation phenology cycles throughout numerous annual NDVI series. The module is based on the iterative decomposition of the NDVI time series into trend, seasonal and remainder components via using the Breaks For Additive Seasonal and Trend (BFASST) and the consequent detection of the abrupt trend changes within the trend component. Applied to Doñana (Spain).

