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Contents

1. Introduction

According to the needs of myEcosystem showcase/ mySpace pilot there are 15 pilot sites (SG1 & SG2) for analysis, whose description and shape files are suggested to be retrieved from deims.org. However, issues arise when it comes to the retrieval of the locations of the sites or the processing of the areas. For example:

Case A: For the 'Lammi LTER – Finland' site deims provides only the centroid coordinate of the assumed area of interest.

Case B: For the 'Svartberget Field-research Infrastructure (LTER)' site deims provides numerous polygons across a wide (usually lengthy) area.

Case C: For the 'LTSER Dutch Wadden Sea Area', 'LTSER Zone Atelier Alpes', 'LTsER-Montado', 'TERENO Harz/Central German Lowland LTER' sites deims suggests a very large polygon, which per case may cover a big percentage of a country area (at national level). Employing processing in such a large area without a specific set of objectives for its entity (e.g. preselection of areas of interest) would cause an irrational use of resources. For example in these cases numerous and diverse designated Protected Areas may be identified.

Case D: For any other pilot site, its extend should be reduced to one tile.

Objective of this document: The areas that will be selected shall be confirmed by the Protected Area/ High Environmental Value Area managers. In case this is not feasible for any reason, the selection could follow an alternative path based merely on objective rulesets, which may be widely applied. This latter case is examined in this document. The main purpose of this document is to identify workflows, which will allow for the best selection of the areas to analyze.

Materials: The protected area's shape files are retrieved from the Natura 2000 site (https://natura2000.eea.europa.eu/). The Corine Land Cover is used to identify each area's land cover richness and is downloaded from https://land.copernicus.eu/pan-european/corine-land-cover/clc2018.

2. Suggested ruleset for areal processing (e.g. downloading of spaceborne images to process)

- **Case A -** pilot sites' location is declared only by the centroid coordinates:

  1. Download the polygon(s) of the closest Natura 2000 site to the centroid point. If no Natura 2000 sites are present within the extent of one 100x100km^2 tile, then stop the search and work on the whole tile, wherein the point location lies. If a point lies in overlapping areas, then select the tile, wherein the point is closest to the center of the tile.

  2. Create the minimum circle that includes the polygon(s) of the selected Natura 2000 site.

  3. Calculate the ratio: R = circle diameter / polygon perimeter.

  4. Employ R as the percentage to expand the surface of the selected polygon(s) for processing (generate the buffer accordingly), so that co-registration errors and neighboring influences may be taken into account.

  5. Use the new buffered polyline of the polygon to draw around the minimum parallelogram. The parallelogram will then encapsulate exactly the buffered area to be processed.

  6. Examine whether the finally delineated parallelogram fits within a Sentinel-2 100x100km^2 tile, and if this not the case, then select reducing the size of the parallelogram towards the tile, which holds the bigger extent of the site within.

- **Case B -** pilot sites' location is delineated by numerous small polygons spread across a wider area:

  1. Create the minimum circle that includes all polygons.

  2. Calculate the ratio: R = circle diameter / accumulative polygons perimeter.

  3a. If R ≥ 1, then a parallelogram shall be drawn around each polygon following Case A steps 3. – 5. Where parallelograms overlap, a bigger one encapsulating overlapping ones shall be created.

  3b. If R < 1, then Case A steps 3. – 5. are applicable.

  4. Follow Case A step 6.

- **Case C -** pilot sites' location is delineated by an all-inclusive very large polygon:

  1. Download all the Natura 2000 sites polygons, which belong to the deims polygon.

  2. Calculate the median area of the downloaded Natura 2000 sites polygons and maintain only those with a surface equal or higher than the median.

  3. Sort step's (2) selected Natura 2000 sites according to their land cover diversity using the Corine Land Cover of 2018.

  4. Select the sites based on their ranking in relation with their land cover diversity (highest first) until the total selected surface area exceeds the 10% of all the designated polygons in the deims suggested large area. Aim is to work demonstratively on the 10% surface of the Natura 2000 sites included in the suggested by the deims all-inclusive large polygon area.

  5. Select the Sentinel -2 tile that contains the most of the selected sites of step 4.

6. Select all the Natura 2000 sites that belong to the selected tile and follow Case B steps 2., 3a or 3b, 4.


- **Case D –** For any other pilot site:

    If the pilot site's polygon belongs to one tile, keep the whole polygon and draw around the minimum parallelogram. The parallelogram will then encapsulate exactly the area to be processed. Else, select the tile that includes the bigger extent of the site, and reduce the site's polygon to fit in this tile.
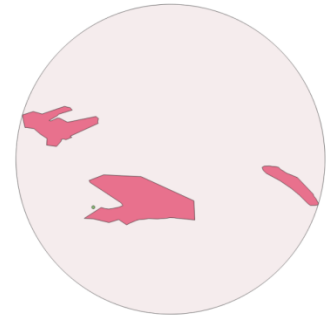
3. Examples

3.1 Case A. For 'Lammi LTER - Finland' deims provides only a centroid coordinates point.

1. Download the polygon(s) of the closest Natura 2000 site to the centroid point.
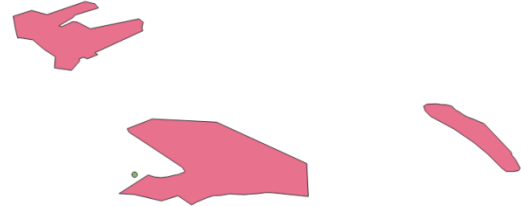
2. Create the minimum circle that includes the polygon(s) of the selected Natura 2000 site.
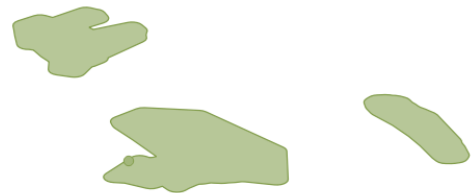
3. Calculate the ratio: R = circle diameter / polygon perimeter.
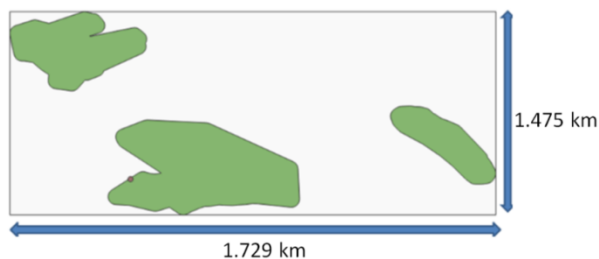Diameter of circle: 3.598 km
Perimeter of polygon: 5.280 km
Buffer: 68%

4. Employ R as the percentage to expand the surface of the selected polygon(s) for processing (generate the buffer accordingly).

5. Use the new buffered polyline of the polygon to draw around the minimum parallelogram. The parallelogram belongs to the tile 35VLH.

1.475 km

1.729 km

Parallelogram size: Width = 1.729 km, Height =1.475 km

Extent: 25.0331078769977466, 61.0513042564871284 : 25.0659293595090134, 61.0650008978941159

Unit: decimal degrees

Projection system: EPSG:32635 - WGS 84 – Geographic

3.2 Case B. For 'Svartberget Field-research Infrastructure (LTER)' site deims provides numerous polygons across a wide (usually lengthy) area.

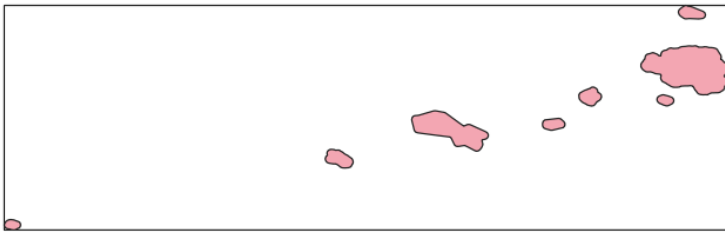1. Create the minimum circle that includes all polygons.
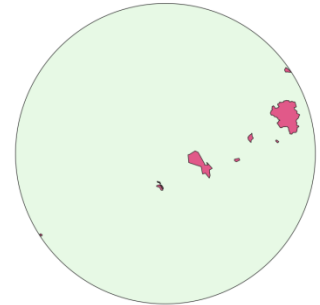
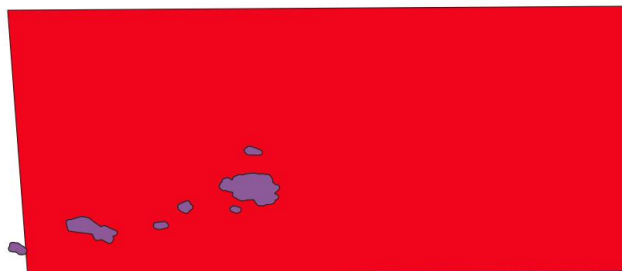2. Calculate the ratio: R = circle diameter / accumulative polygons perimeter.

R = 102276 / 118134 = 0.87.

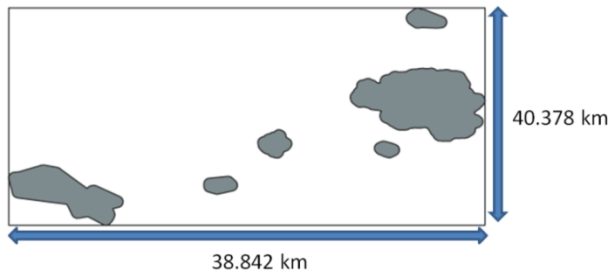3a. If R < 1, then Case A steps 3. – 5. are applicable.

Add 87% buffer to the polygons' surface and create a parallelogram around the buffered polygons:

4. The biggest extent of the polygons belong to the tile 34WDS.

Clip polygons to the tile and create a parallelogram around the clipped boundaries:

40.378 km

38.842 km

Extent: 19.1031322479248047, 64.0416183471679688 : 19.8981132507324219, 64.4038162231445313
Unit: decimal degrees
Projection system: EPSG: 4326 - WGS 84 – Geographic

3.3 Case C. For the area 'LTSER Zone Atelier Alpes – France' deims suggests a very large polygon, which per case may cover a big percentage of a country area (at national level).

1. Download all the Natura 2000 sites polygons, which belong to the deims polygon.

Number of natura areas: 96
Total area: 9076.451 km^2
10% of the total area: 907.645 km^2
Median area of natura areas: 46.951 km^2

2. Calculate the median area of the downloaded Natura 2000 sites polygons and maintain only those with a surface equal or higher than the median.

3. Sort step's (2) selected Natura 2000 sites according to their land cover diversity using the Corine Land Cover of 2018.

4. Select the sites based on their ranking in relation with their land cover diversity (highest first) until the total selected surface area exceeds the 10% of all the designated polygons in the deims suggested large area.

➔ Total selected area is 956.948 km^2 and the 10% of the total Natura 2000 sites in the large deims polygon area is 907.645 km^2

5. The tile, which includes the most of the selected Natura 2000 sites, is the 31TGJ.

6. Select all the Natura 2000 sites which belong to the tile 31TGJ:

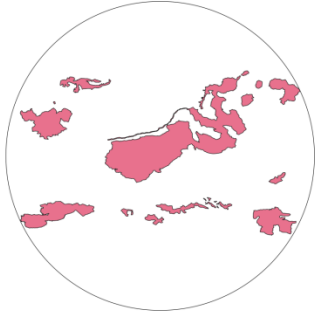*For more information please contact: imanakos@iti.gr*
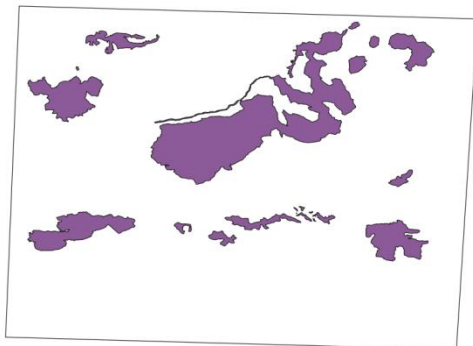
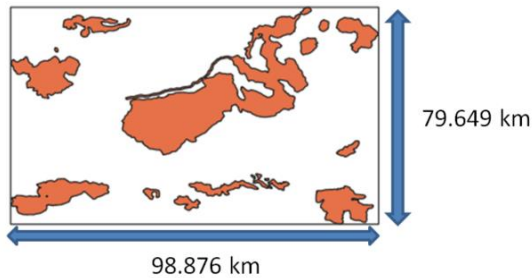Create the minimum circle around the Natura polygons:

Perimeter: 11.703370363019252
Diameter: 1.3405 degrees
Buffer: 11%

Add 11% buffer to the polygons' surface and create the minimum parallelogram around the buffered area.


Extent: 5.5262373491263110,43.4633077868049398 : 6.7480588634102077,44.1801614541696495
Unit: decimal degrees
Projection system: EPSG: 4326 - WGS 84 – Geographic

3.4 Case D. Doñana Long-Term Socio-ecological Research Platform

The biggest extent of the Doñana Long-Term Socio-ecological Research Platform belongs to the tile 29SQB. Thus, the boundaries will be clipped to this tile and a parallelogram will be created around the new boundaries.
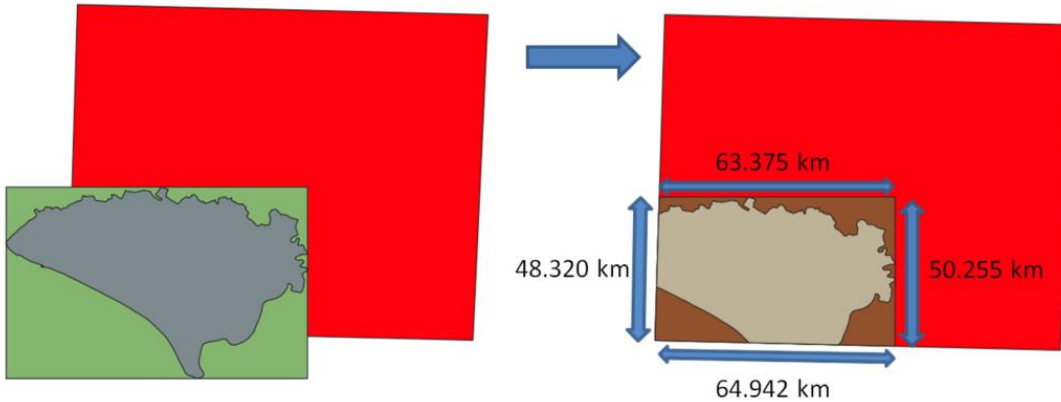
Extend: -6.7546767103607976, 36.9190881222534983 : -6.0260968724066997, 37.3719134325580029
Unit: decimal degrees
Projection system: EPSG: 32629 - WGS 84

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