Regionalisation in openLCA

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Regionalisation in openLCA

Content

1) Flow-based regionalisation
2) Geospatial-based regionalisation
3) Concluding remarks

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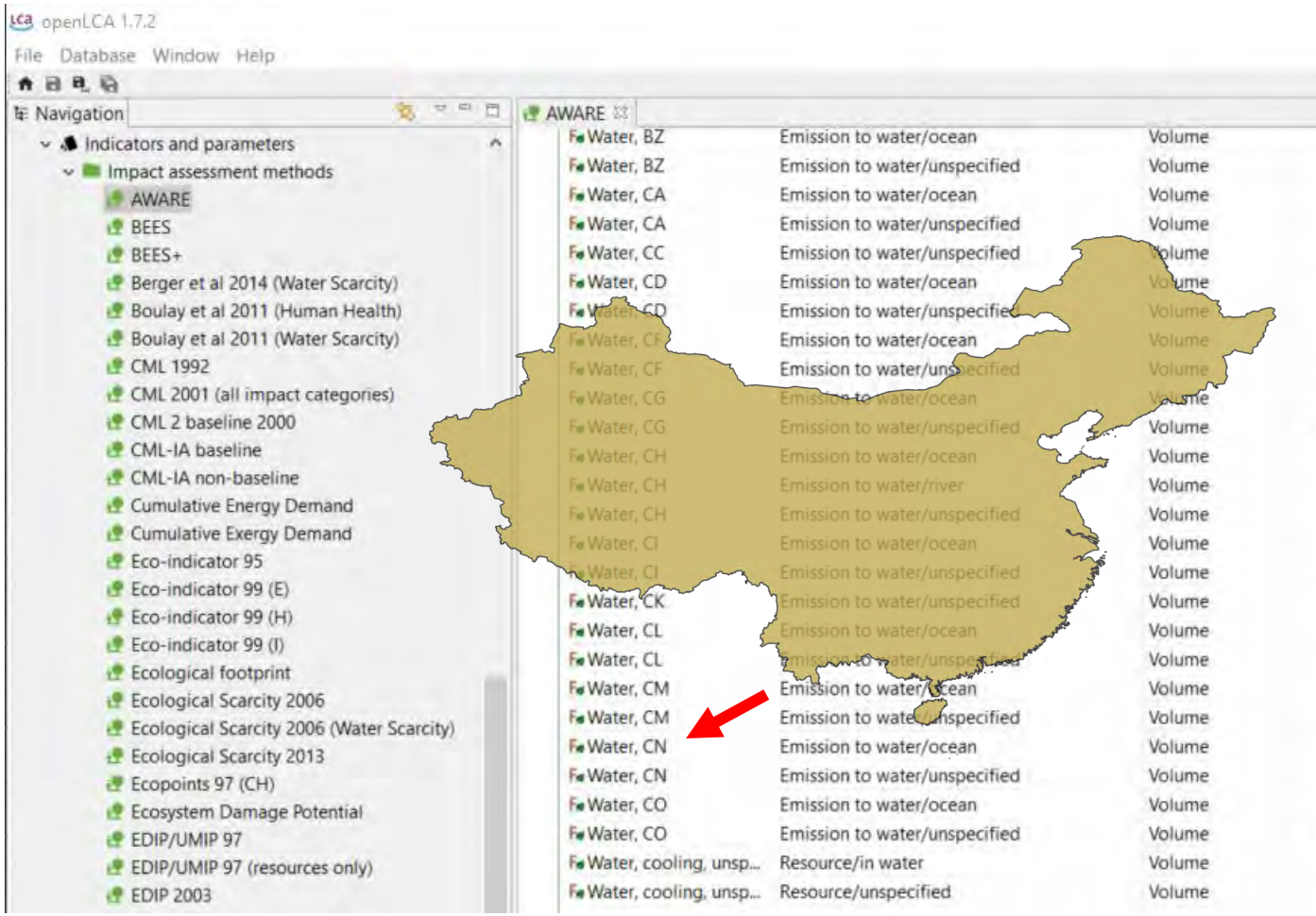
Regionalisation in openLCA

Flow-based regionalisation

- *openLCA LCIA methods v2*
- Individual elementary flows for specific regions (e.g. countries)
- AWARE
- ILCD 2011 Midpoint+



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Flow-based regionalisation

Subgroup by processes ☑ Cut-off 1 %

Name	Category	Inventory result	Impact factor	Impact result	Unit
Water use - AWARE				11.81453	m3
P irrigation CN	Agricultural / Transformation			24.95496	m3
F Water, river, CN	Resource / unspecified	0.41340 m3	42.40000 m3/m3	17.52836	m3
F Water, well, in ground, CN	Resource / unspecified	0.17516 m3	42.40000 m3/m3	7.42659	m3
P rice production CN	0_rice case foreground / CN			-13.14502	m3
F Water, CN	Emission to water / unspecified	0.31002 m3	-42.40000 m3/m3	-13.14502	m3

Subgroup by processes ☑ Cut-off 1 %

Name	Category	Inventory result	Impact factor	Impact result	Unit
Water use - AWARE				20.94645	m3
P irrigation US - US	Agricultural / Transformation			30.03187	m3
F Water, well, in ground, US	Resource / unspecified	0.53506 m3	33.80000 m3/m3	18.08519	m3
F Water, river, US	Resource / unspecified	0.35345 m3	33.80000 m3/m3	11.94668	m3
P rice production US - US	0_rice case foreground / US/CH			-9.16271	m3
F Water, US	Emission to water / unspecified	0.27109 m3	-33.80000 m3/m3	-9.16271	m3

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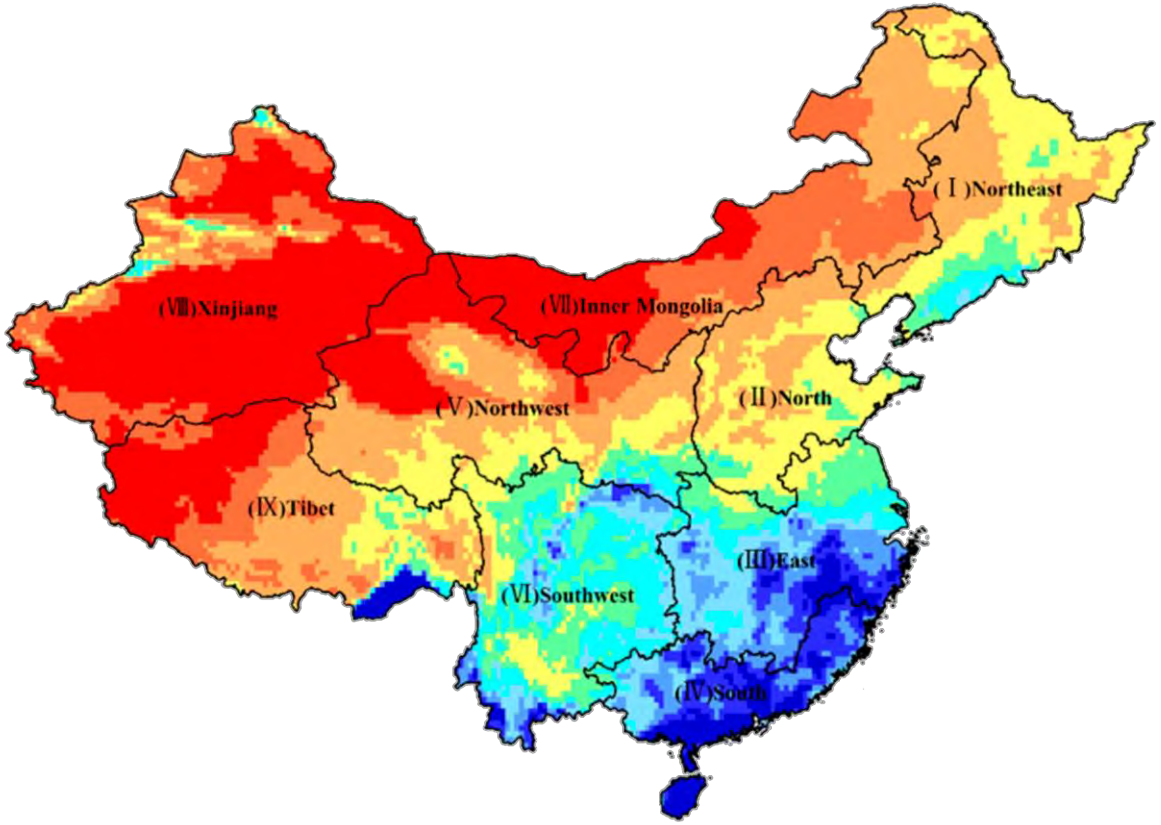
Why Geospatial-based regionalisation?



Source: http://www.mdpi.com/2073-4433/9/3/104 (12.09.2018)

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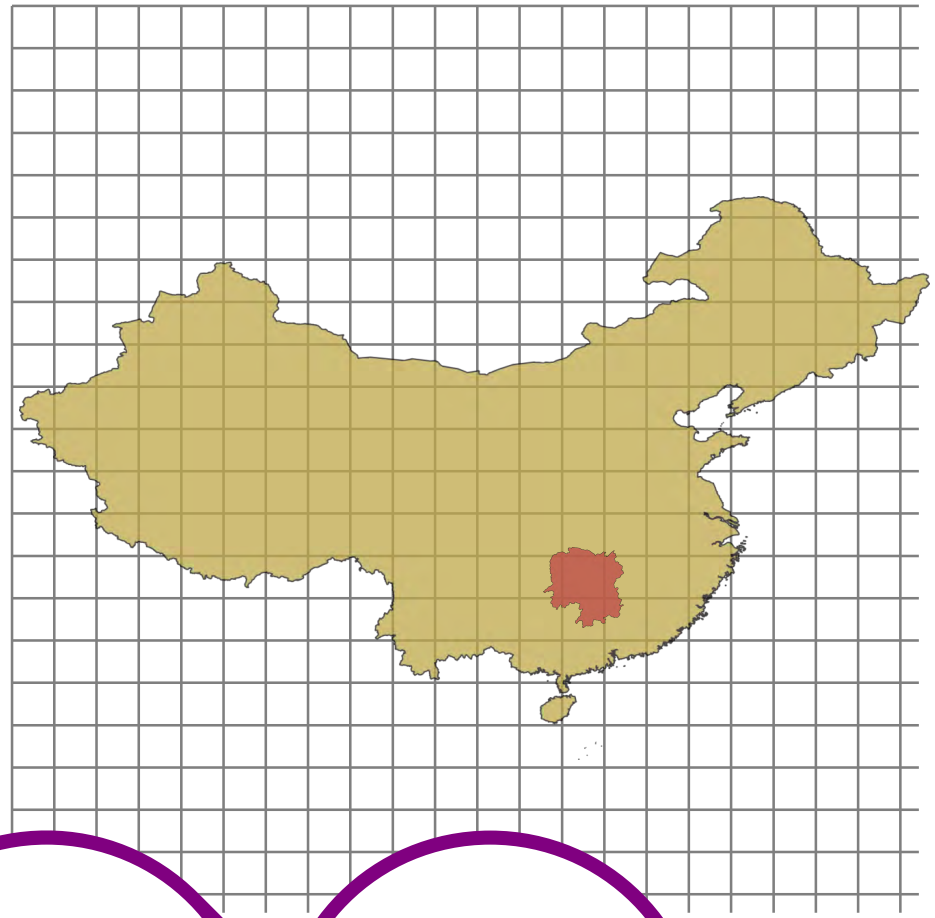
Geospatial-based regionalisation

- Shape (*.shp) in Geographic Information Systems (GIS) software e.g. QGIS or ArcGIS for background data
- Preparation of Keyhole Markup Language (*.kml) file as a mask to regionalise a LCA



Georeferenced attributes (shape) in GIS software → Import into openLCA → Linkage of parameters to georeferenced attributes → KML mask to delineate a specific region → Calculation of regionalised LCIA results

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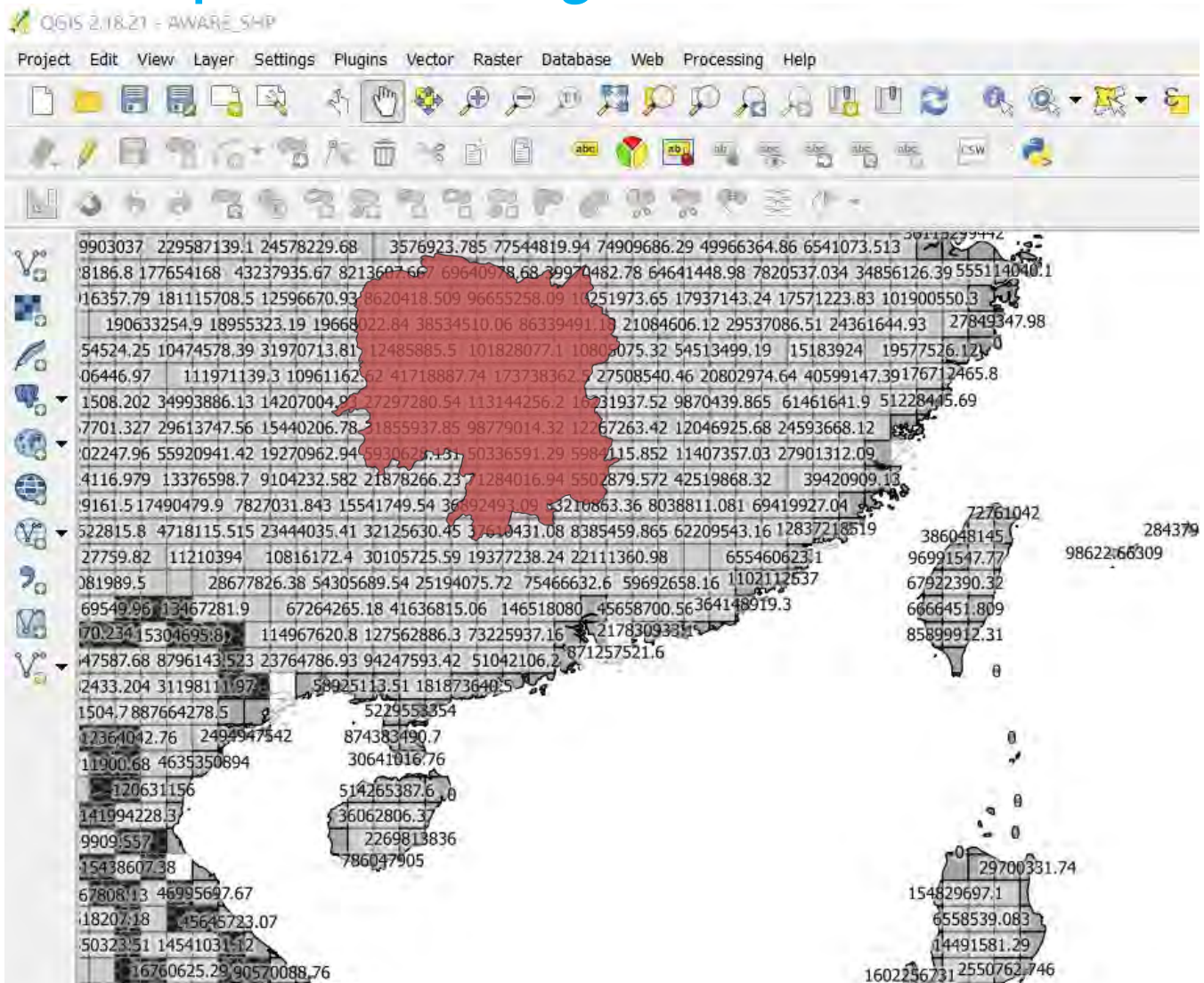
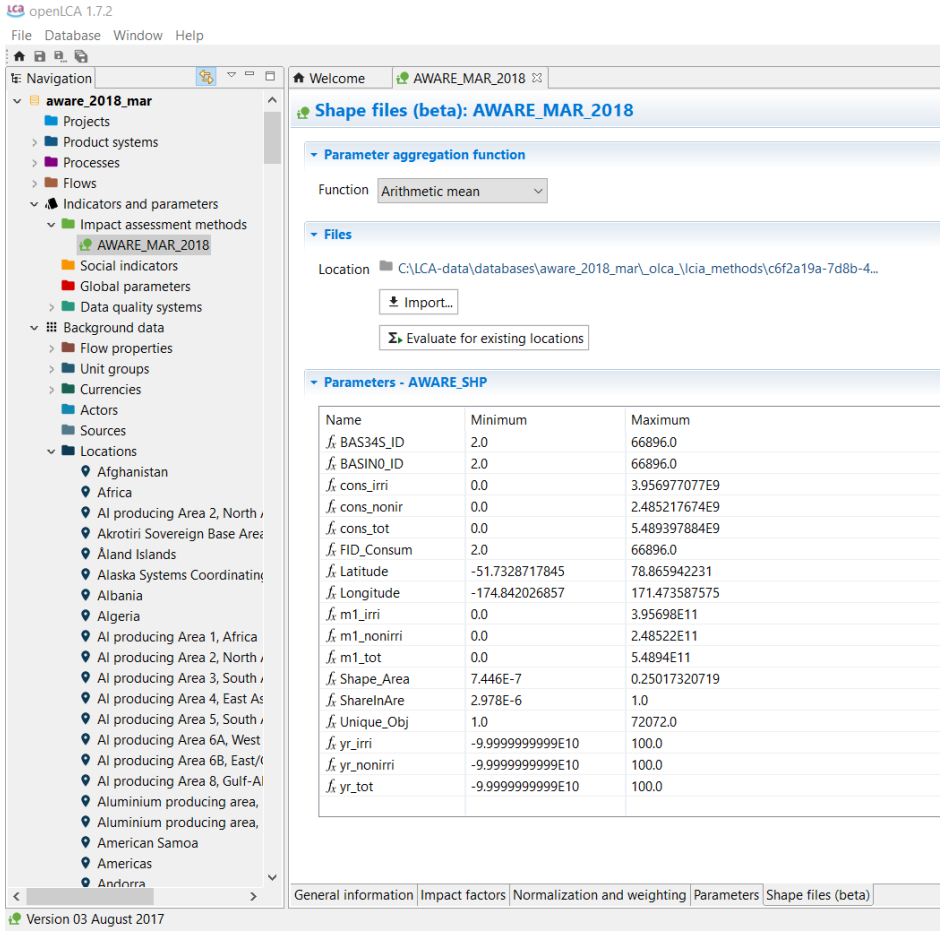
Geospatial-based regionalisation





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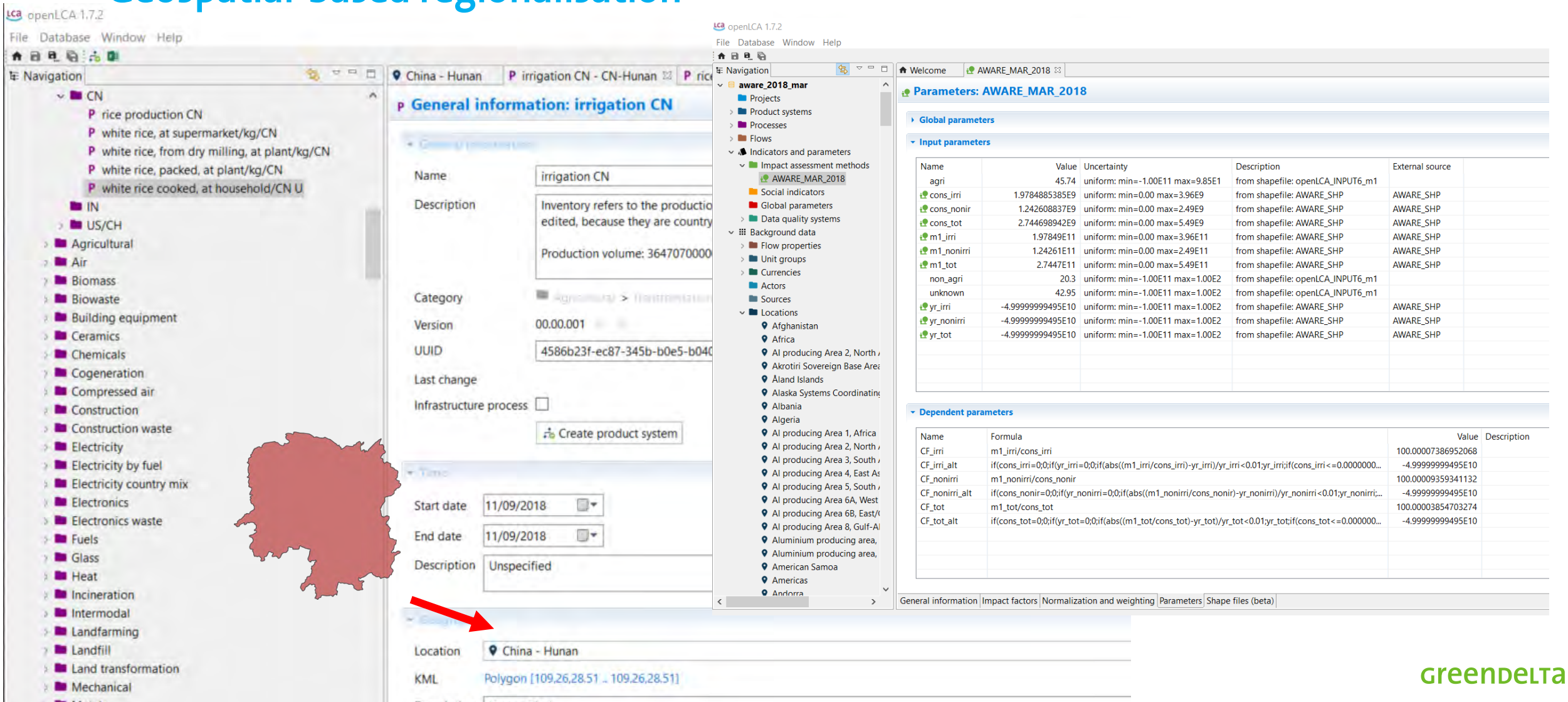
Geospatial-based regionalisation



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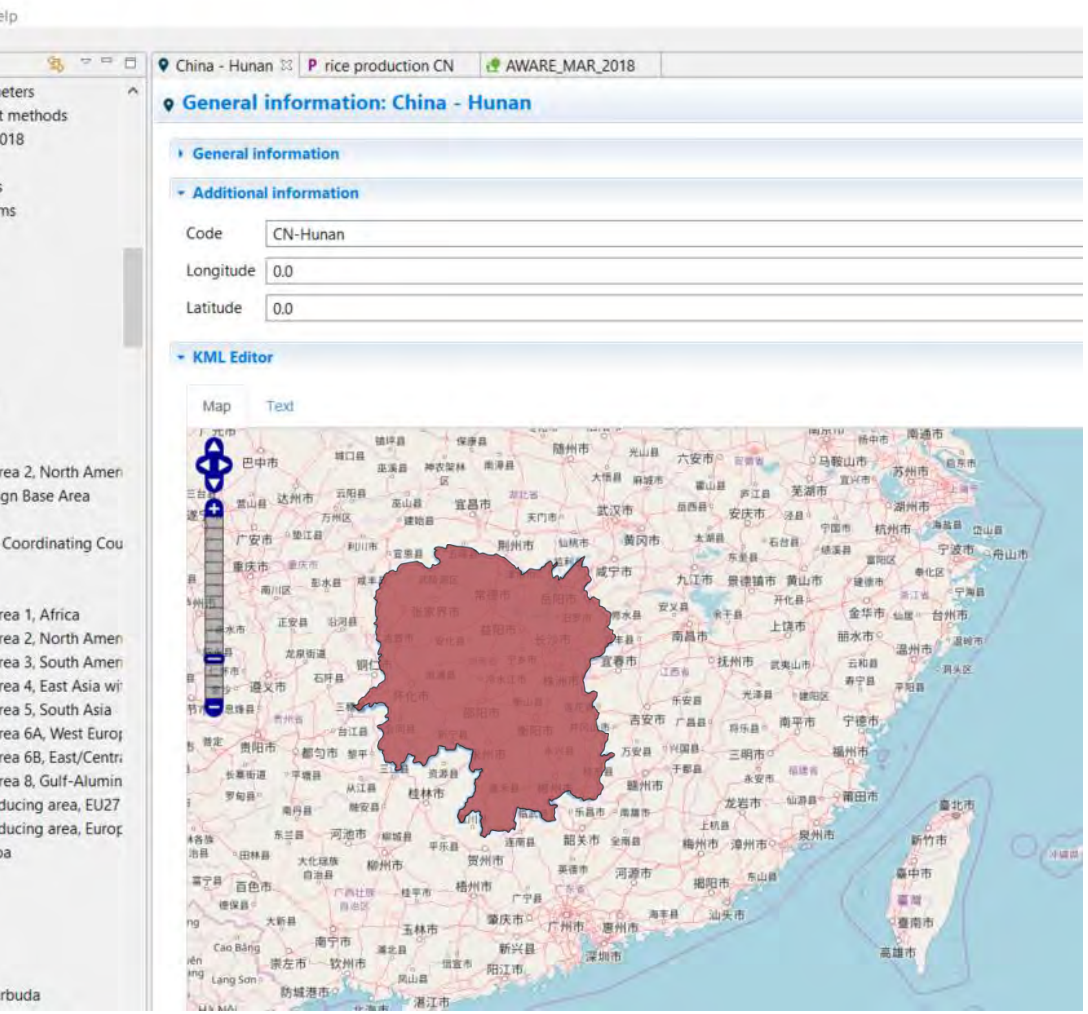
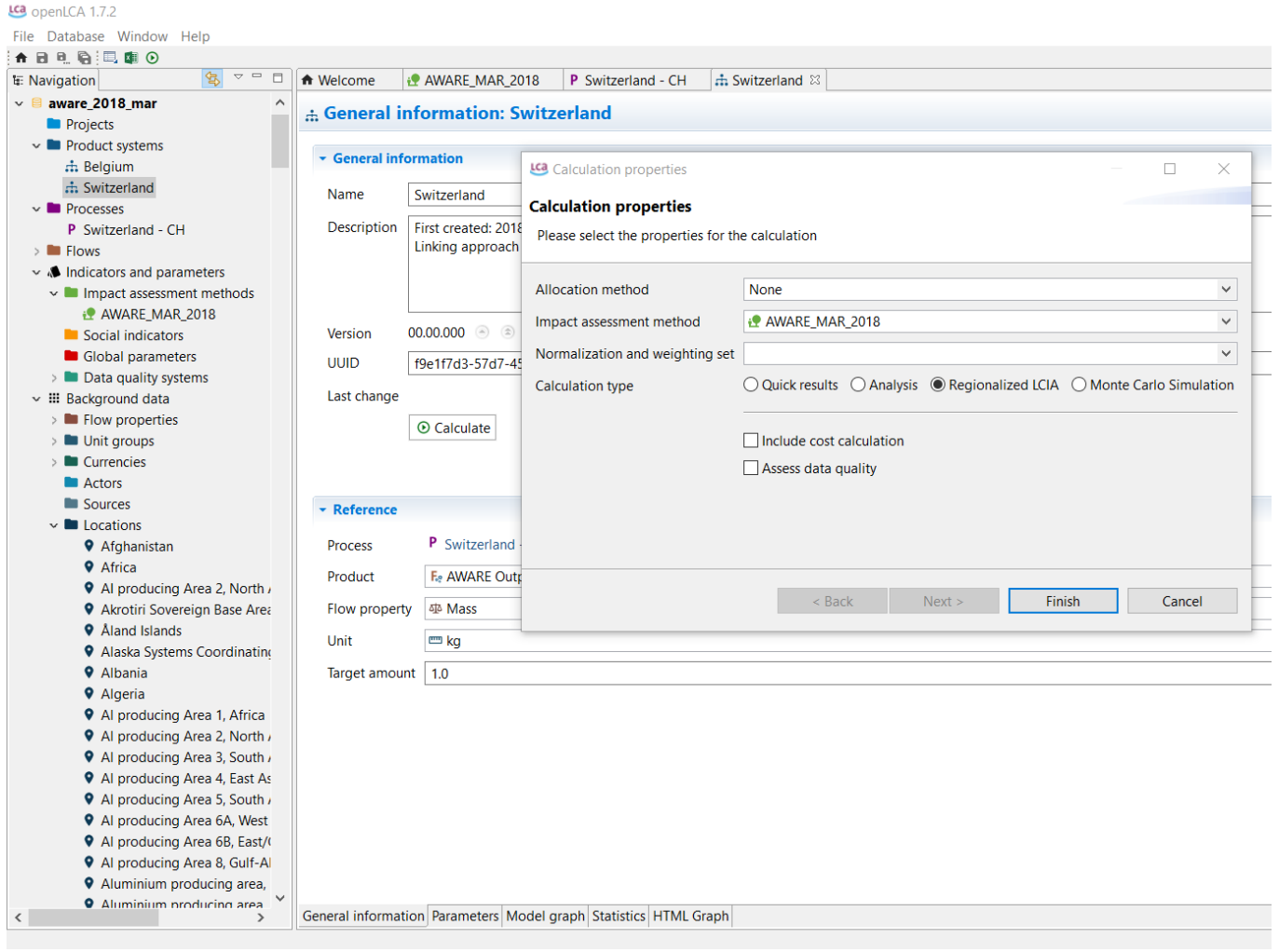
Geospatial-based regionalisation





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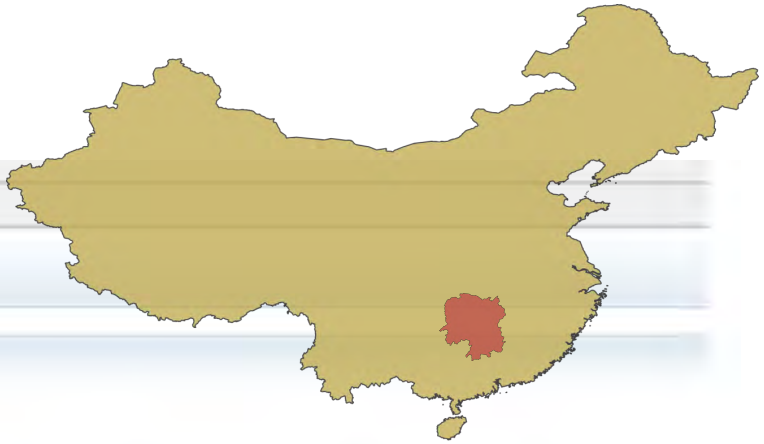
Geospatial-based regionalisation



white rice cooked, at household/CN U | Regionalized LCIA result

Impact analysis: white rice cooked, at household/CN U

Impact analysis

Subgroup by processes ☑ Cut-off 1 %

Name	Category	Inventory result	Impact factor	Impact result	Unit
Water use (Midpoint, per watershed, weighting by consumption)				0.24088	m3
P irrigation CN - CN-Hunan	Agricultural / Transformation			0.23810	m3
F Water, river	Resource / in water	0.41340 m3	0.40454 m3/m3	0.16724	m3
F Water, well, in ground	Resource / in water	0.17516 m3	0.40454 m3/m3	0.07086	m3
Water use (Midpoint, per country, pre-defined factors)				25.26826	m3
P irrigation CN - CN-Hunan	Agricultural / Transformation			25.27866	m3
F Water, river	Resource / in water	0.41340 m3	42.95000 m3/m3	17.75573	m3
F Water, well, in ground	Resource / in water	0.17516 m3	42.95000 m3/m3	7.52293	m3

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Flow-based regionalisation

- Requires regionalised elementary flows (impact factors)
- Based on existing technique (*mature – but limited?*)
- Amount of required flows escalates
- Inadequate for high-resolution regionalisation?

Geospatial-based regionalisation

- Requires geospatial data
- Novel approach *(beta)*
  - *Current best practice example in openLCA:* AWARE
- Synergies with other georeferenced data sets?
  - NASA's Socioeconomic Data and Applications Center (SEDAC)
  - UNEP Environmental Data Explorer
  - FAO GeoNetwork

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Thank You for Your Attention!

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