

OSM and Hydro DB's National Data comparison

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Comparison study between OSM, EU Hydro and National data by IGN Spain (NMA)

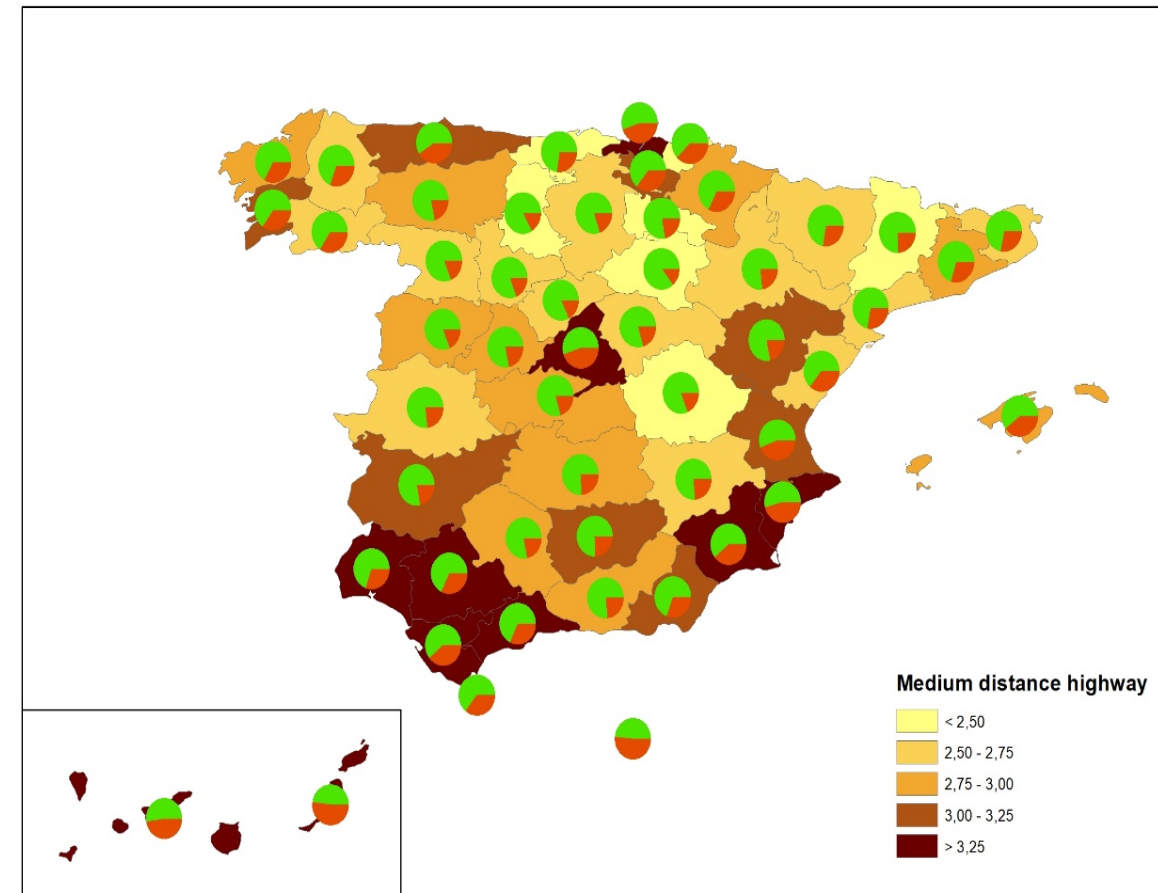
- Compared data
 - **OSM (road and rail)** transport features
 - Copernicus Land Pan European **EU HYDRO**
 - Geospatial Reference Information on **Transport Network** (GRI-TN) road and rail, and **Hydrographic Network** (GRI-HI)
- Study objectives
 - Estimation of **completeness**
 - Massive **geometric comparison** of elements
 - **OSM and EU trustworthy**
- Motivated by
 - Assessment of national, EU HYDRO and OSM data
 - Copernicus Land, CORINE Land Cover Plus, CLC-Backbone requirements
- **Stakeholders**
 - EC, Copernicus, EEA, EAGLE
 - EuroGeographics & NMAs
 - EC, INSPIRE community, JRC
 - National users
 - OSM community

Compared datasets in Spain

	OSM	EU HYDRO	National GRI-TN &HY Spain
Production	Crowdsourcing	Copernicus Land Services (EEA)	Integration of authoritative information from Public Administrations
Scale	Heterogeneous, depending on the editor	From 1:30.00 to 1:50.000?	From 1:500 to 1:25.000, depending on the feature type
Versions	Continue	Public Beta	Continue
License	OdBL. Open for some applications. http://www.openstreetmap.org/copyright	Open and Free (open and free access as established by the Copernicus data and information policy Regulation (EU) No 1159/2013)	CC-BY. Open for all applications. http://centrodedescargas.cnig.es/CentroDescargas/locale?request_locale=en#
Topology	yes, implicit in the data model	Yes	yes, explicit in the database for all transport modes
Thematic content	https://wiki.openstreetmap.org/wiki/Main_Page#Features	https://land.copernicus.eu/pan-european/satellite-derived-products/eu-hydro/eu-hydro-public-beta/eu-hydro-river-network?tab=metadata	http://www.ign.es/web/ign/portal/cbg-redes-transporte http://www.idee.es/csw-codsi-idee/srv/spa/catalog.search#/metadata/spainHIDROGRAFIA_IGR
INSPIRE compliant	no	No	Yes
Download	https://www.openstreetmap.org/ or from open data delivers such as http://download.geofabrik.de/	https://land.copernicus.eu/pan-european/satellite-derived-products/eu-hydro/eu-hydro-public-beta/eu-hydro-river-network?tab=download	WFS: http://servicios.idee.es/wfs-inspire/transportes http://servicios.idee.es/wfs-inspire/hidrografia?SERVICE=WFS&REQUEST=GetCapabilities&VERSION=2.0.0 Also downloadable in shapefile format at: http://centrodedescargas.cnig.es/CentroDescargas/index.jsp

Massive geometric comparison

- Evaluation the **distance between** OSM nodes/vertexes and National GRI Transport Networks.
 - Completely automatic
 - No samples all nodes/vertexes, entire country
 - Calculated by provinces (NUTS-3) and aggregates by country
 - Maximum homologues distance 25 m
 - Comparison by feature types



SPAIN: Distance between homologous nodes/vertexes from OSM and National GRI-TN (25 m homologous distance)

OSM Feature type	OSM Homologous nodes/vertexes	Medium distance OSM Nat GRI-TN [m]	OSM Not homologous nodes/vertexes	% OSM Not homologous nodes/vertexes
highway	24.959.722	2,85	11.009.650	30,6%
railway	207.094	3,21	63.004	23,3%

Massive geometric comparison

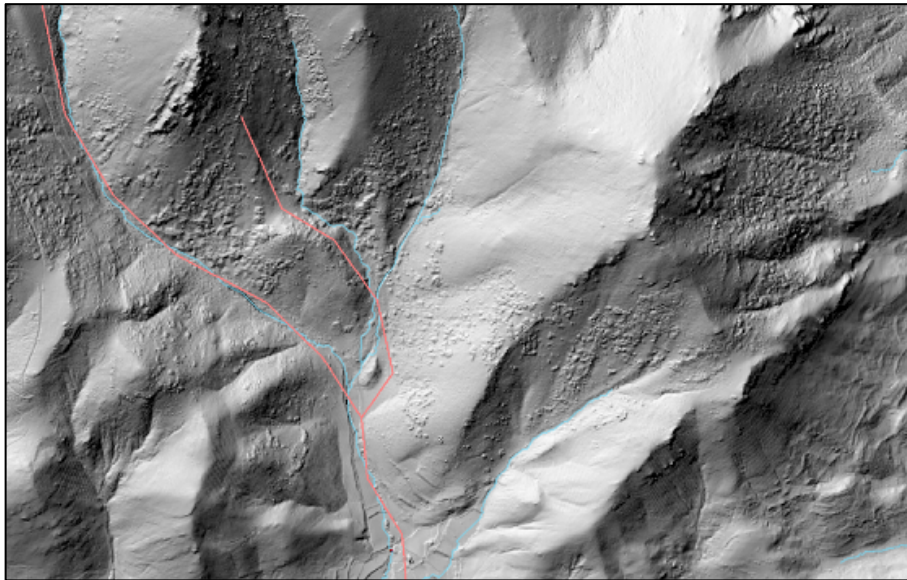
- Evaluation of OSM **completeness** with National GRI Transport Networks.

SPAIN: Estimation of completeness (25 m homologous distance)				
OSM Feature type	Nat GRI-TN Length [m]	OSM Homologous length [m]	Estimation of completeness	OSM Not homologous length [m]
1001 Motorway	40.025.134	39.466.376	0,99	319.697
1003 Roads	251.937.898	193.706.452	0,77	736.572
2000 Urban	208.155.979	219.516.577	1,05	20.944.158
3000 Paths	1.485.221.171	639.863.913	0,43	105.189.729
5000 Railway	22.311.167	29.250.776	1,31	3.868.575

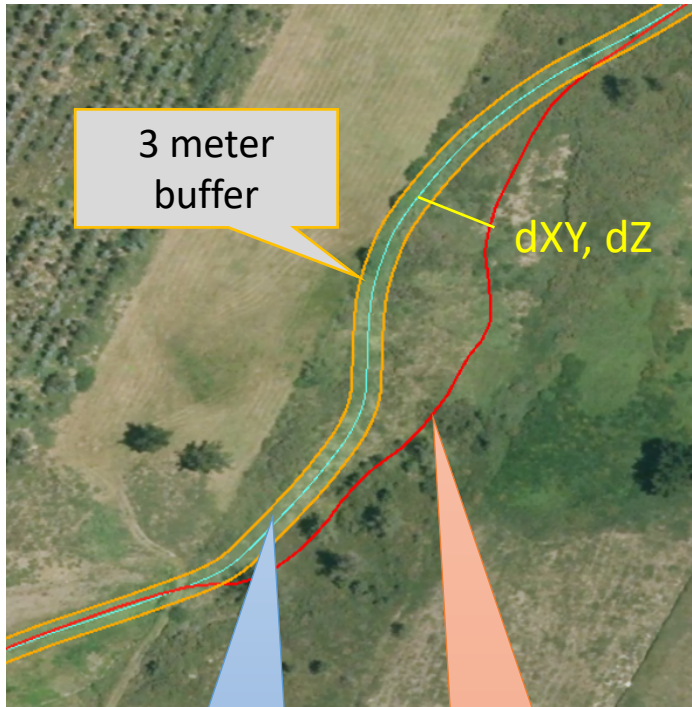
EU HYDRO trustworthy: verification Spain

Assessment made according to several (on-going) verification exercises in Spain, checking EU-HYDRO with stereoscopic control points:

- EU-HYDRO (red) verification shows positional accuracy lower of +/- 10m in x, y, z
- National Hydrographic GRI derived from PNOA Lidar (blue) provides positional accuracy of 3m in x,y and <1m in z



Verification Methodology



Zone1: Duero-Spain (1724 km²)

(Measures in meters)

EU-HYDRO

NETWORK	PointType	n point	dXY_MED	dXY_DESV	dXY_MIN	dXY_MAX	dZ_MED	dZ_DESV	MIN_ELEV	MAX_ELEV
EU_HYDRO-DUERO_SPAIN	Watercourse	2040	8,521	7,015	0,016	39,575	4,956	4,495	788,608	1771,919
EU_HYDRO-DUERO_SPAIN	Junction	9	12,463	7,713	2,578	26,585	28,083	47,315	840,939	1372,9
EU_HYDRO-DUERO_SPAIN	TransportCross	51	7,605	7,718	0,508	33,795	5,19	3,801	813,553	1331,91

RSMxy

RSMz

Zone2: Ebro-Spain (1900 km²)

(Measures in meters)

EU-HYDRO

NETWORK	PointType	n point	dXY_MED	dXY_DESV	dXY_MIN	dXY_MAX	dZ_MED	dZ_DESV	MIN_ELEV	MAX_ELEV
EU_HYDRO-EBRO_SPAIN	Watercourse	1777	8,663	7,332	0,014	39,776	9,236	6,028	253,39	1205,136
EU_HYDRO-EBRO_SPAIN	TransportCross	30	12,128	9,701	0,699	37,868	12,862	21,11	261,34	1270,735

RSMxy

RSMz

Conclusions: Current situation

- OSM exists and will exist in a long term but...
- ...there is no rigorous knowledge of the geometric and thematic quality of OSM across Europe
- EU HYDRO and EU DEM is being supported (and financed) by Copernicus Land, but...
- ... EU HYDRO and EU DEM are not harmonised and coherent from the beginning
- EU HYDRO spatial resolution does not fit Copernicus Land requirements (nor national requirements)

Conclusions: Consequences

- **Unawareness** about OSM & EU HYDRO in NMA
- Official and public initiatives (e.g. Copernicus) propose use OSM data instead NMA data
- **Threat to NMA survival in medium-long term** (Duplicating of mapping effort)

Conclusions: Proposed actions for NMAs

- **Take actions to acquire rigorous knowledge of the geometric and thematic quality of OSM & EU HYDRO in their countries**
- Provide harmonized national products (INSPIRE compliant) of resolution equal to or better than that of OSM & EU HYDRO according to the needs of Copernicus (including data policy)
- Improve cooperation with OSM, avoiding parallel actions for the benefit of all parties

Conclusions: Collaboration between NMA and OSM?

- **NMA awareness** of OSM data in their territory
- **NMA certification and/or update current OSM data**

Thanks

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