WATER, SOIL AND WASTE
DRESDEN NEXUS CONFERENCE
DNC 2017 | SDGs & NEXUS APPROACH: Monitoring and Implementation

Understanding the Urban Story using Earth Observation

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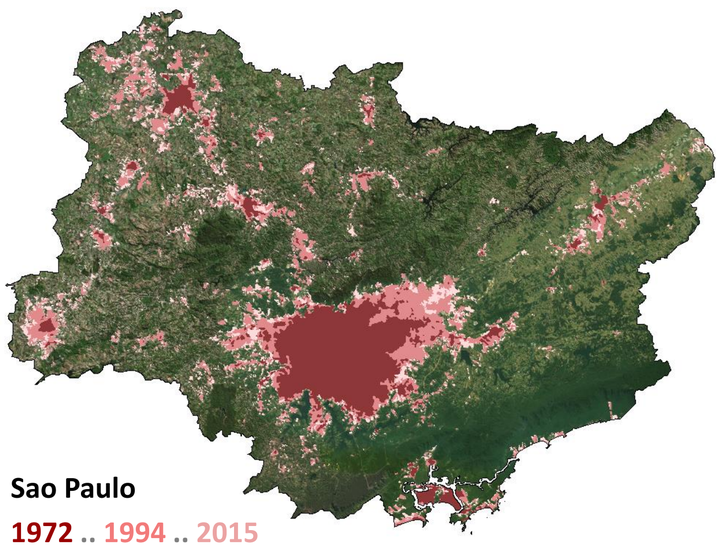
What is the Status?
Where are the Changes?
Why?
Which Risks?
Which Circumstances?

Mapping
Monitoring
Planning
Addressing
Guidance

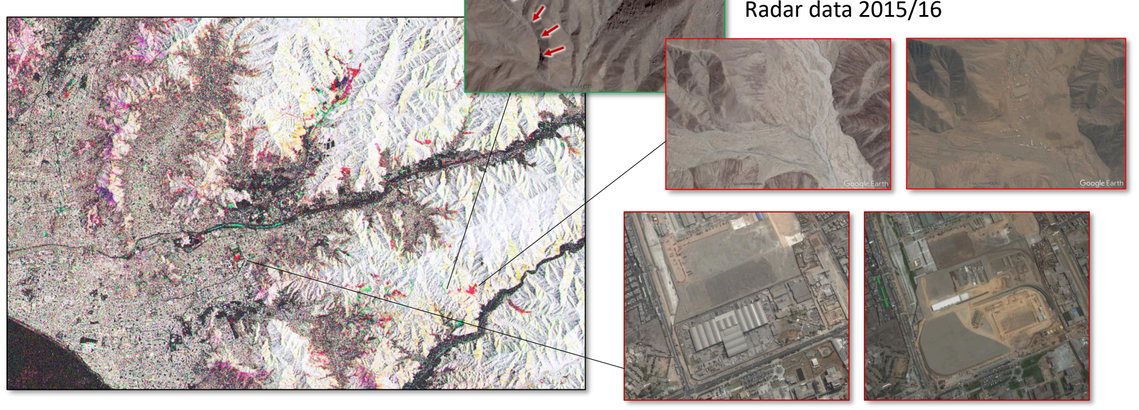
... become a better place to live



Sao Paulo
1972 .. 1994 .. 2015

Hot-Spot Identification

Cloud independent analysis

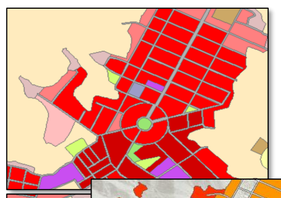


- Identification of changes, as trigger point for further actions (Updating, detailed Analysis, Intervention, …)
- As support for Risk Analysis and Risk Prevention

- Near Real-time application

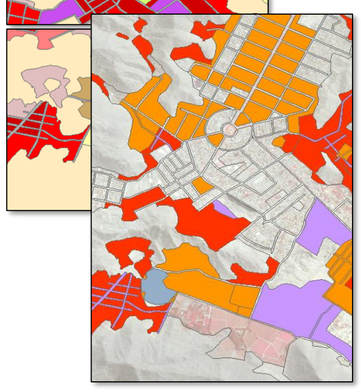
Transportation Network

- Fast transit road, Other roads, Railroad
- Roads MMU 10m (buffering in 3m intervals)
- Focus is set on spatial analysis of the entire metropolitan area, therefore transportation is mapped as area feature



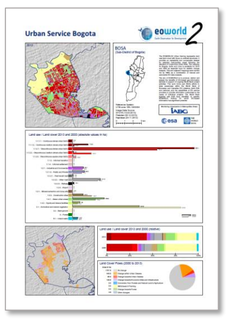
Urban Service of various years

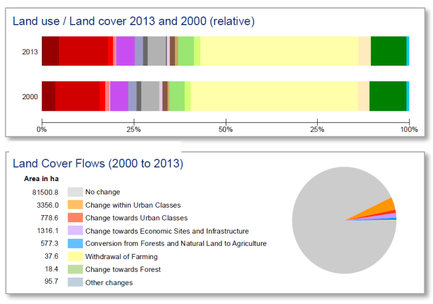
- Urban Atlas Standard (MMU 0.25/ 1ha), geometry compatible to Google Maps/ ESRI Basemap, thematic accuracy > 96%, 71,800 polygons
- Backdating approach: (1) up-to-date mapping, (2) mapping historic data (considering 2013)
- containing 18 urban and five non-urban classes

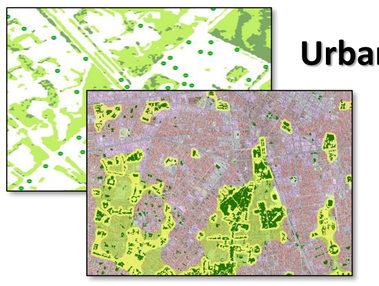


⇨ Urban Change Layer & Statistics

- Detailed change types as well as grouped into main change characteristics

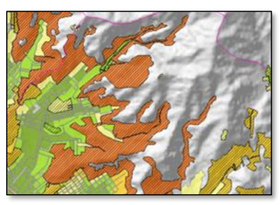






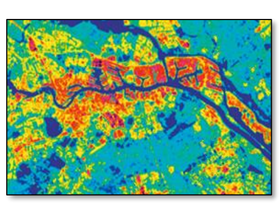
Urban Vegetation Layer

- Low and high vegetation (MMU 0.1ha), significant single trees
- Automatic analysis, also applicable to other features (e.g. informal, construction)
- Input for regional analysis (vegetation corridors for climate issues, change analysis of urban green to identify socio-economic conversion or commercial activities, …)
- Modelling Green Urban Spaces



Terrain Analysis

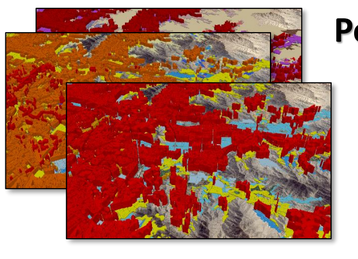
- Considering Urban Mapping Service(s)
- Identification of areas under prior changes for risk identification issues (land slides), natural protection issues (destructive competition), or calculation of natural drainage flow (risk prevention), urban climate issues (emission/ air pollution/ urban heat islands …)



Urban Climate

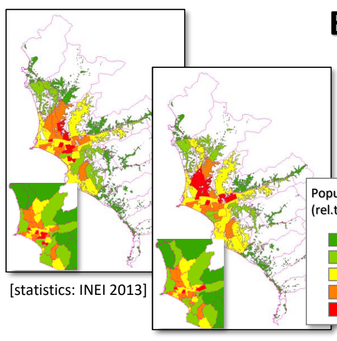
- Identification of urban heat islands
- Analysis in combination with other general Land Cover Services

Combining EO Services with Statistics



Population Distribution (day/ night)

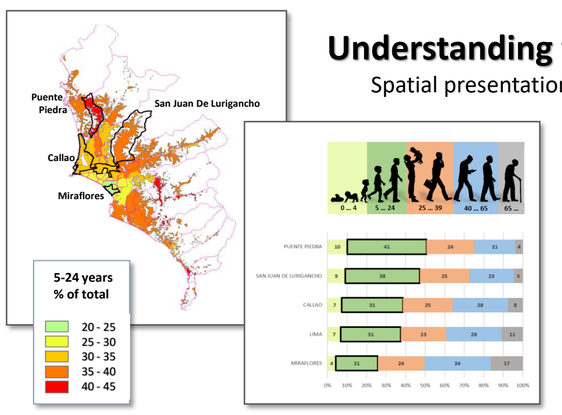
- Combination of Urban Service 2013 and population values (administrative units and/ or building blocks)
- As support for optimization and planning processes for infrastructure and supply issues (public transport, goods, health and security, risk prevention and management, …)



[statistics: INEI 2013]

Bringing Statistics to the Urban Footprint

- Statistics are often related to administrative units or correspond to general assumptions (e.g. average space for living per person, …)
- Showing these statistics related to administrative units often falsifies the real situation
  → Extrapolating out-of-date statistics onto new situation (land cover)
  → Representing and valuing the statistics and changes with regard to real situation
  → Extrapolating future scenarios and numbers



Understanding the Spatial Story

Spatial presentation of statistical values can support the understanding of complex structures and developments of urban agglomerations.
The example shows the age structure of Lima citizens and its interrelation to urban growth: The historic inner-city centre is half populated by people older than 40 years whereas the outskirts are significantly younger. This is related to financial leeway and age of people moving into the city and starting to raise their families there.
This information could directly affect the urban planning process dealing with social infrastructure issues.

Basic Mapping examples of Lima are related to a project, funded by ESA „Monitoring Urbanization in Latin American Metropolitan Areas (ESRIN/AO/1-7663/13/I-AM)“

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