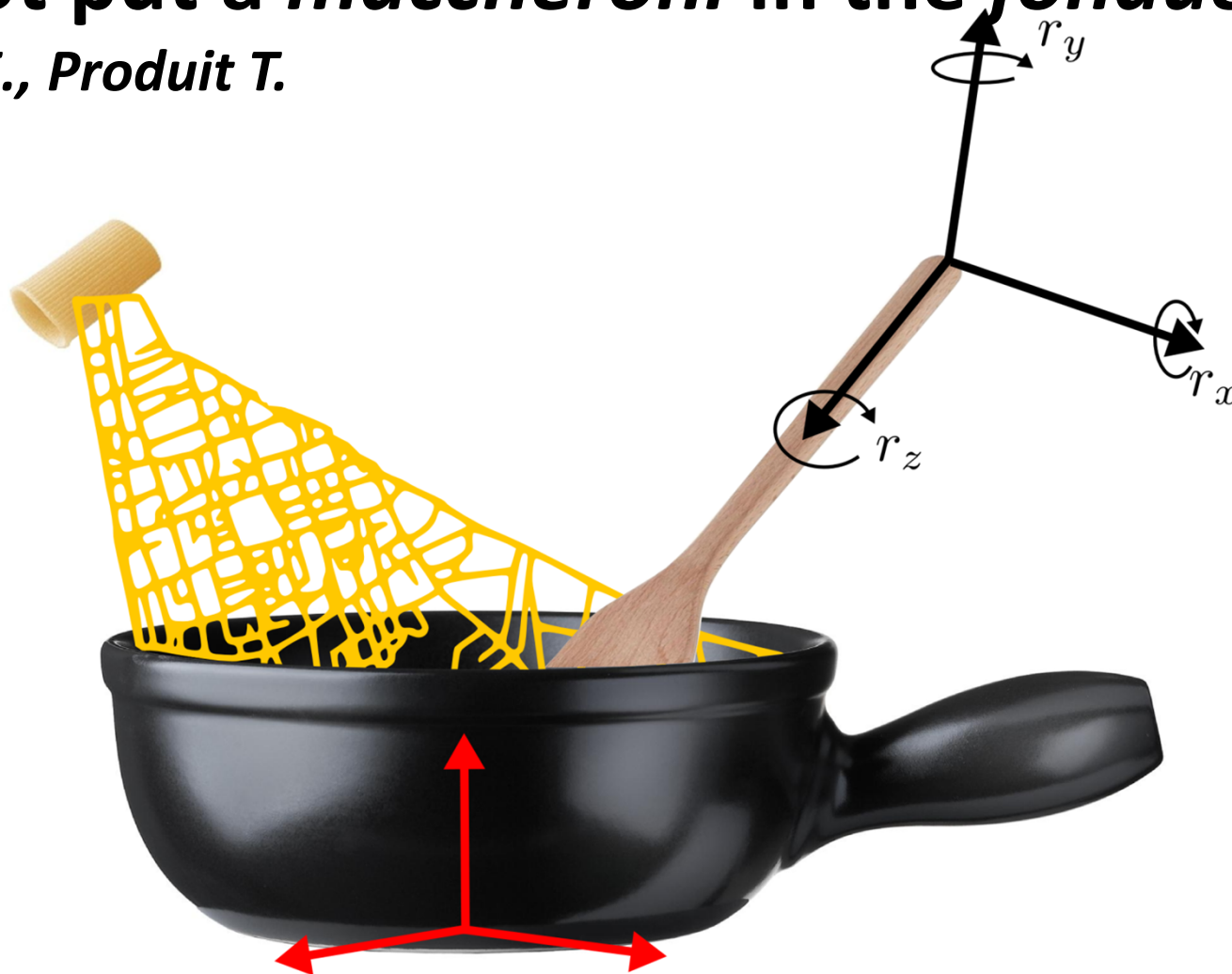


Do not put a *maccheroni* in the *fondue*

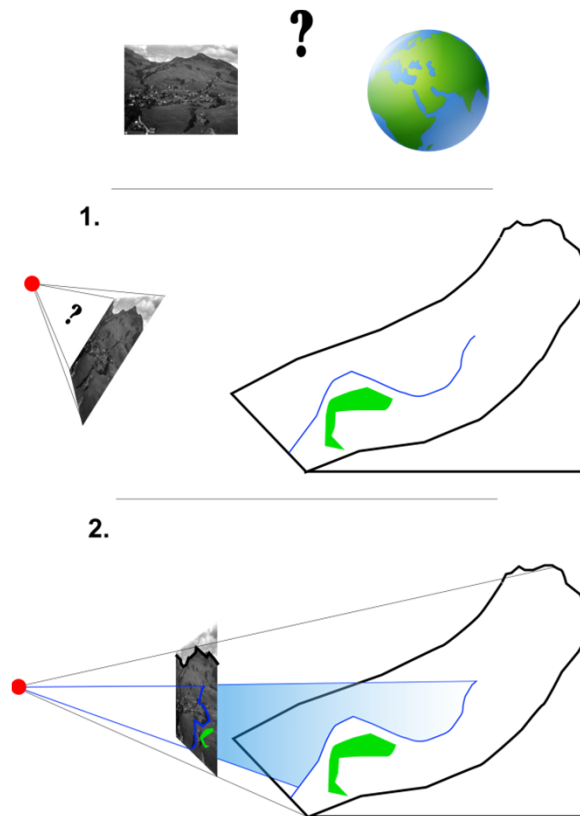
Strano E., Produit T.



Pose estimation of an oblique landscape image thanks to GIS layers

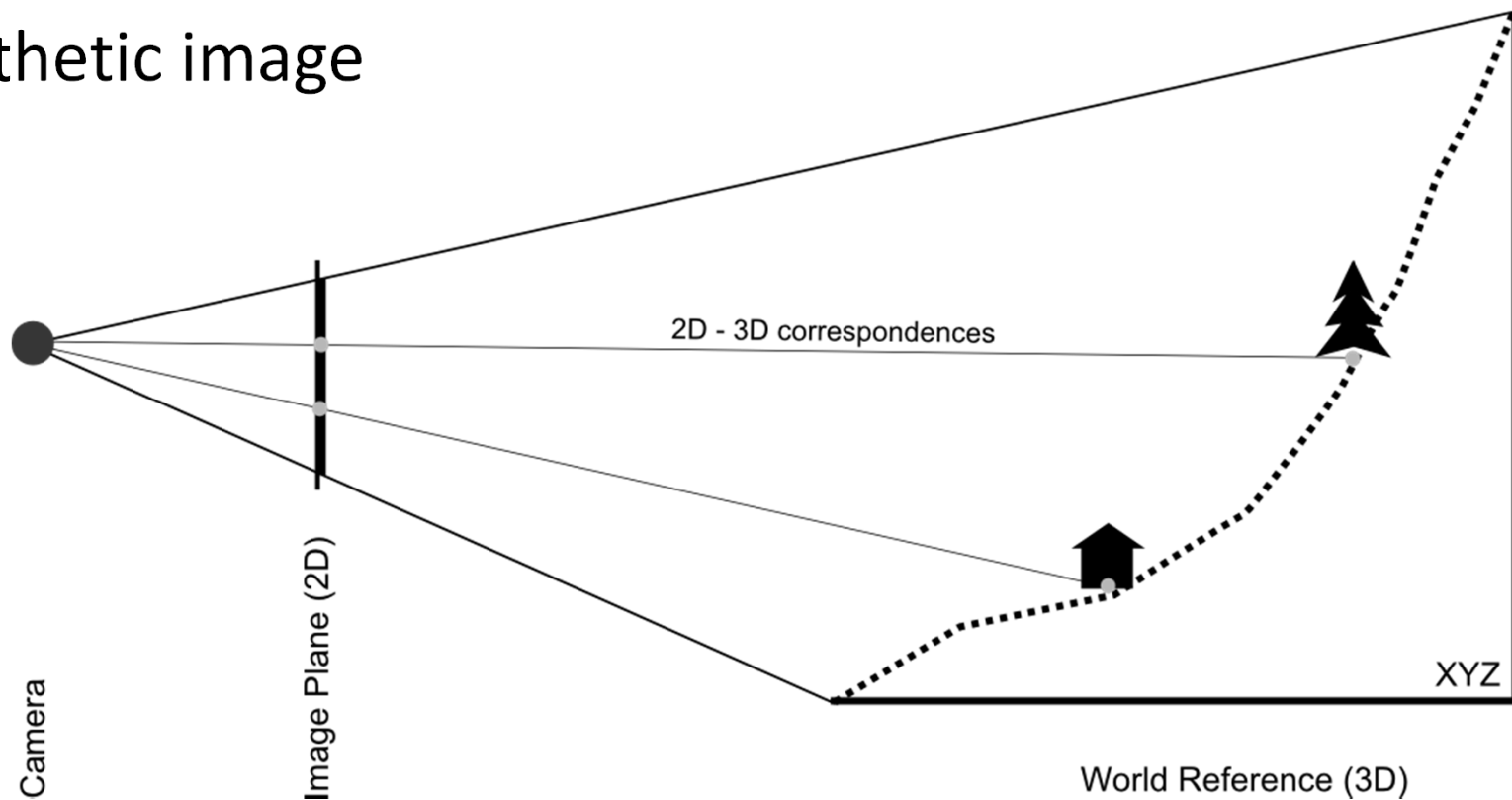


Pose estimation of an oblique landscape image thanks to GIS layers



Geometry

- Pose estimation
- Ortho-rectification
- Synthetic image



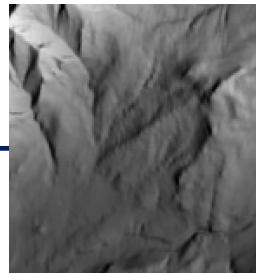
Monoplotter

- **World to image transformation = Augmented Reality:**

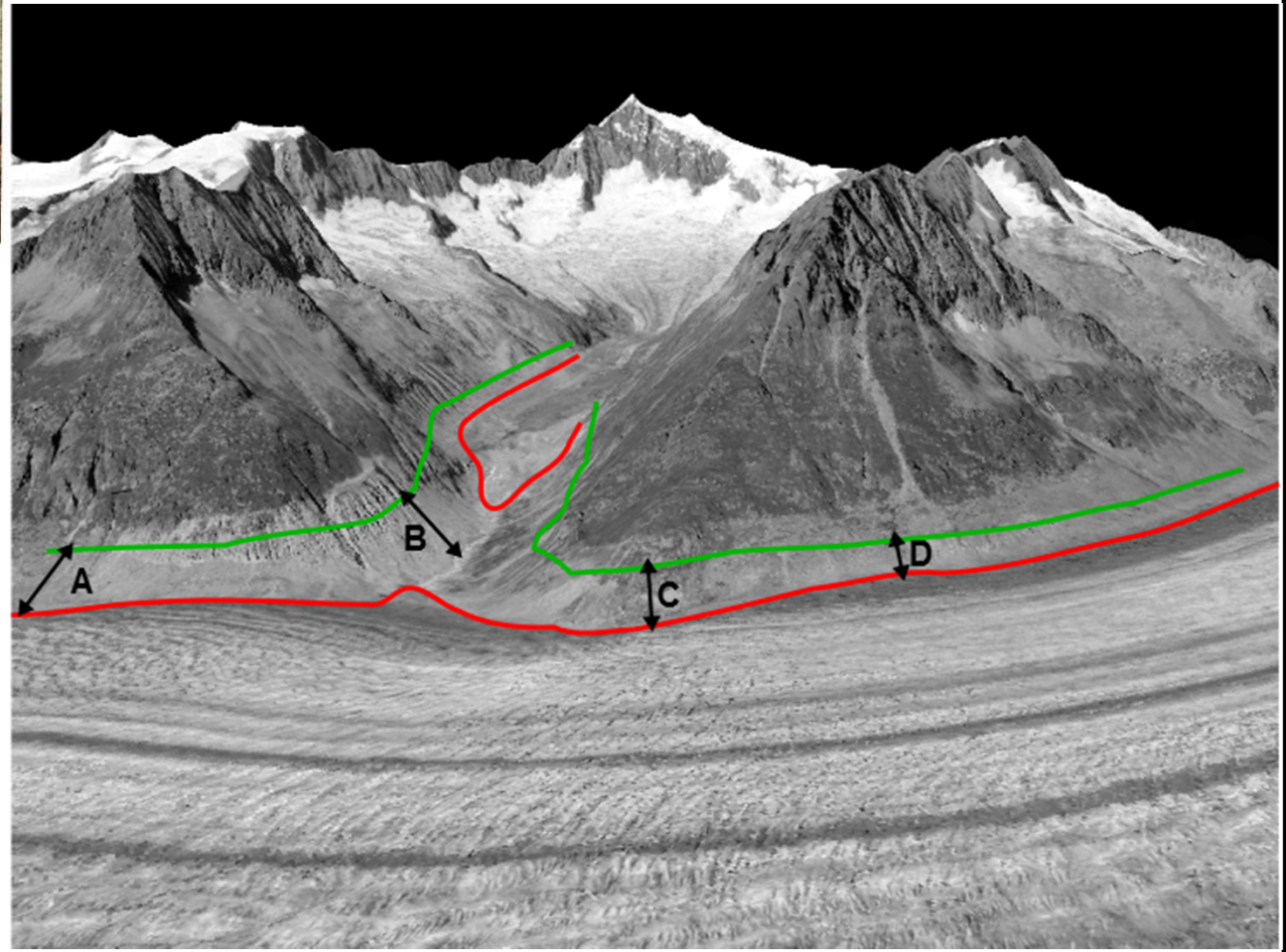


Monoplotter

- **Image to world** transformation: Ortho-image creation:



Monoplotter



Profil	Δ Horizontal [m]	Δ Vertical [m]
A	311	82
B	191	120
C	202	83
D	130	44

Matches identification in the image and in the synthetic image

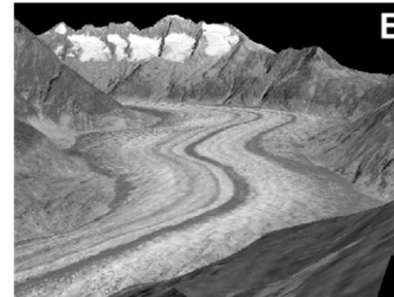
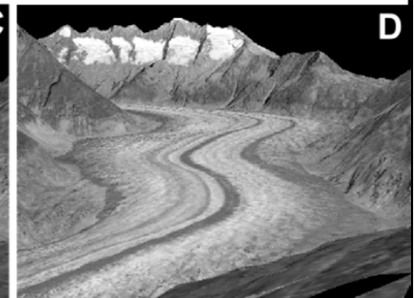
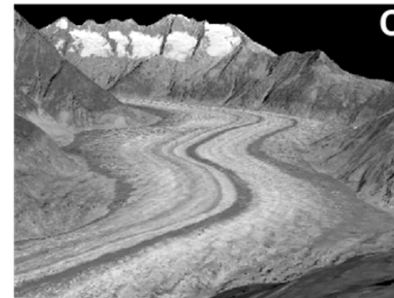
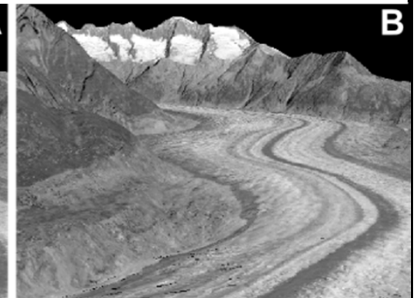
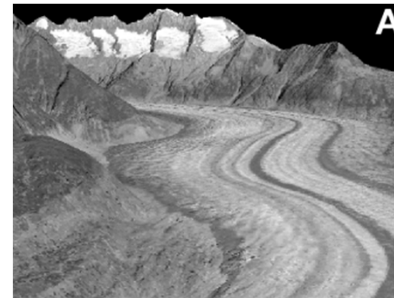
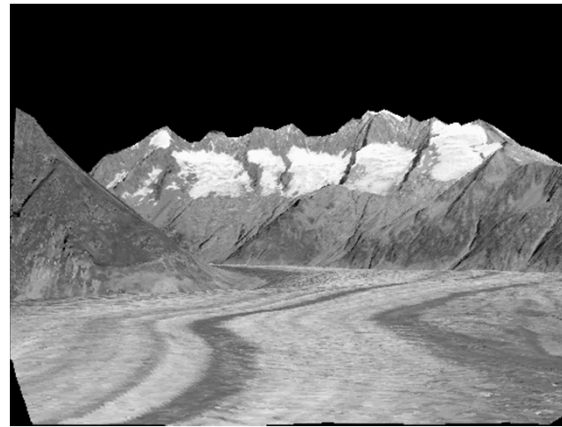
- Synthetic image = $f(\text{Ortho-image}, \text{DEM})$
 - Synthetic image quality analysis
 - Could region based features detectors be applied
 - Problem:
 - Image quality is very different
 - (Surface object are distorted)
- Synthetic image = $f(\text{Landscape vectors}, \text{DEM})$
 - Forest, Urban area, rivers, roads...
 - Edges (horizon, break lines) extracted in the DEM
 - Those shapes have to be recovered in the image
 - Problem:
 - Natural object have poorly discriminative shapes
 - Morphologic edges are available in hilly/mountainous areas



Current research

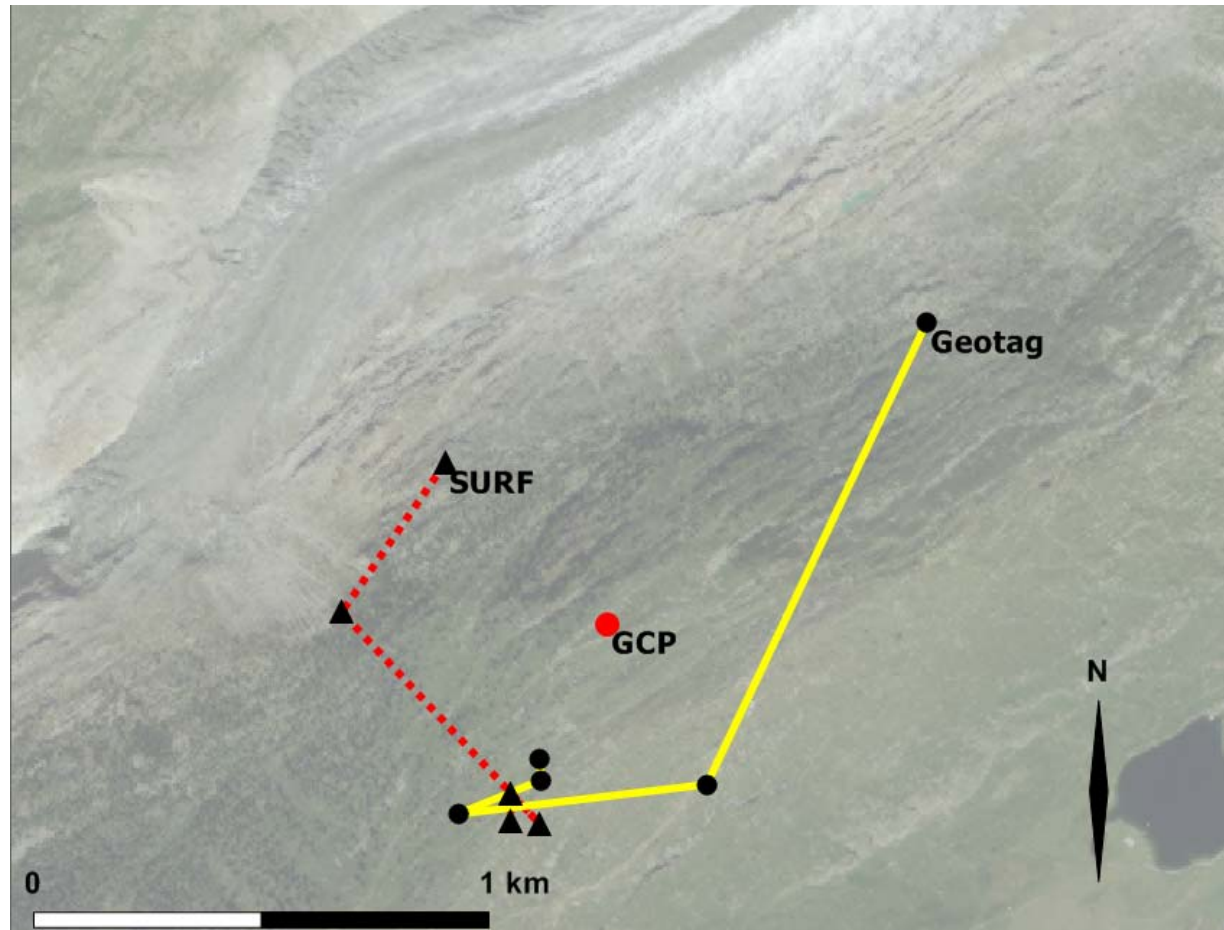
Method:

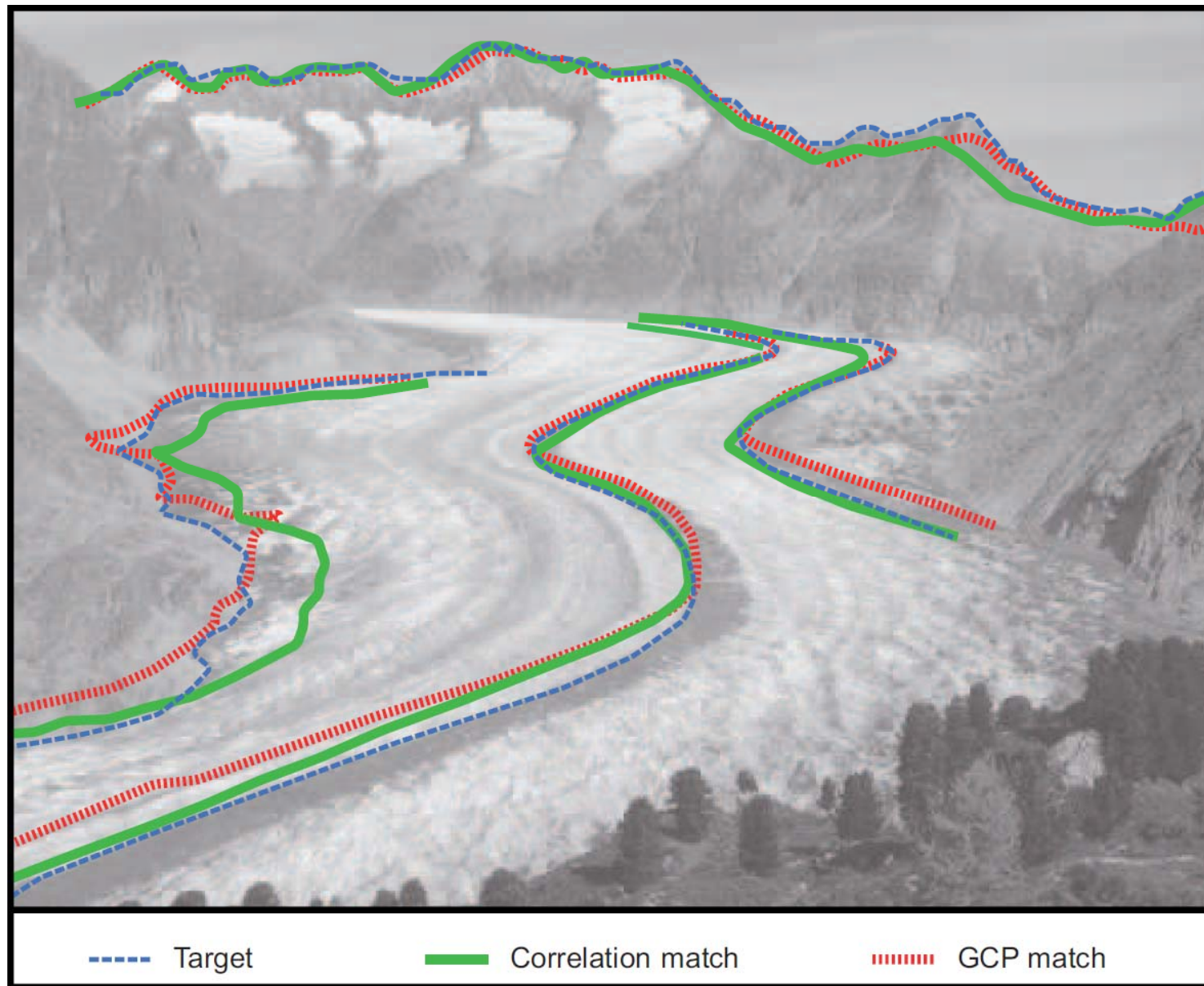
- Feature detection
- Feature matching with NCC



Current research

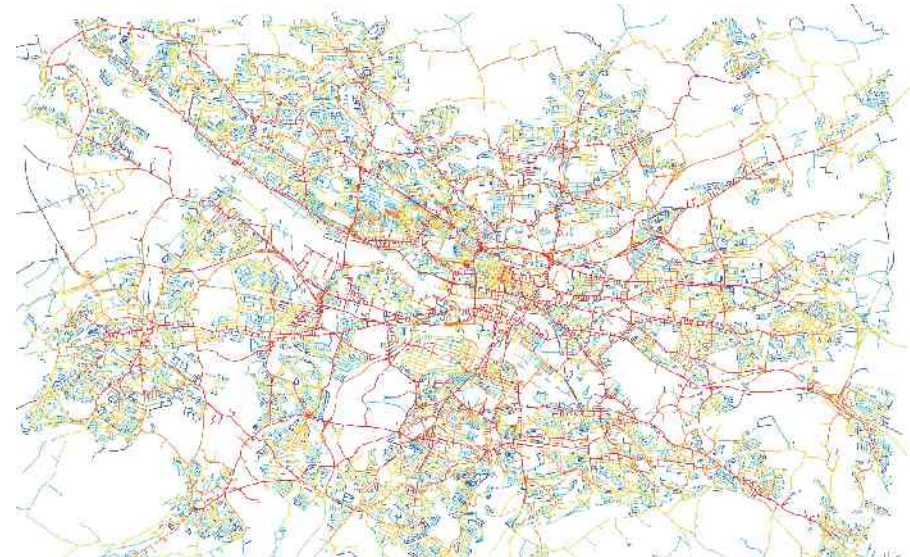
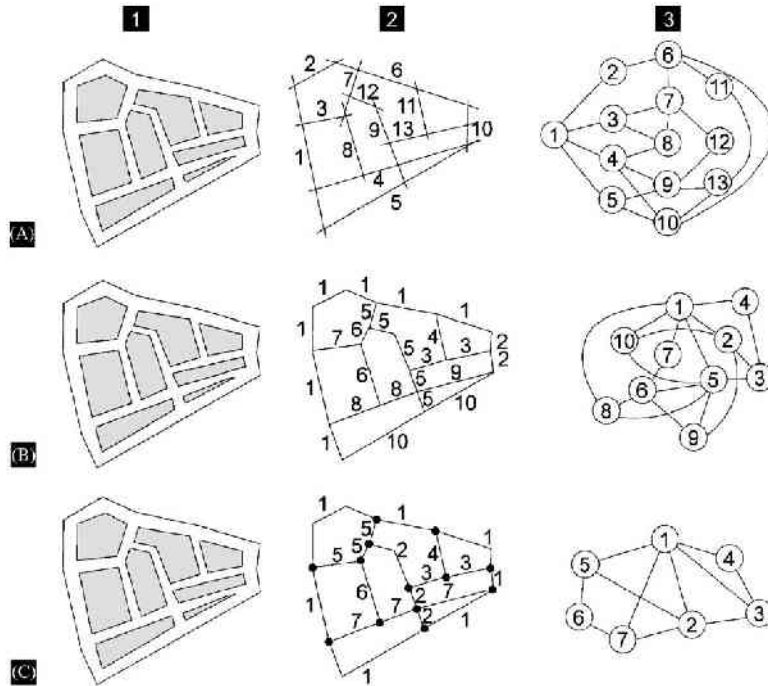
Results



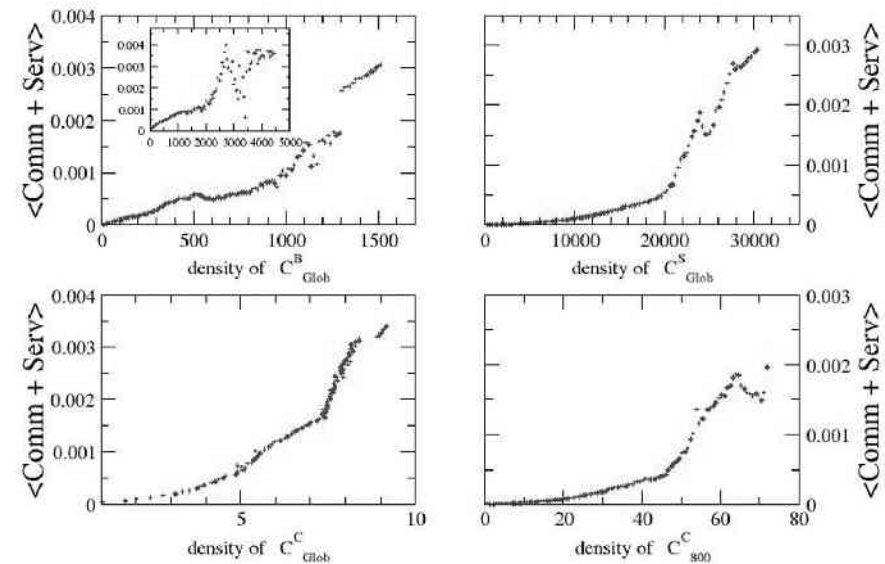
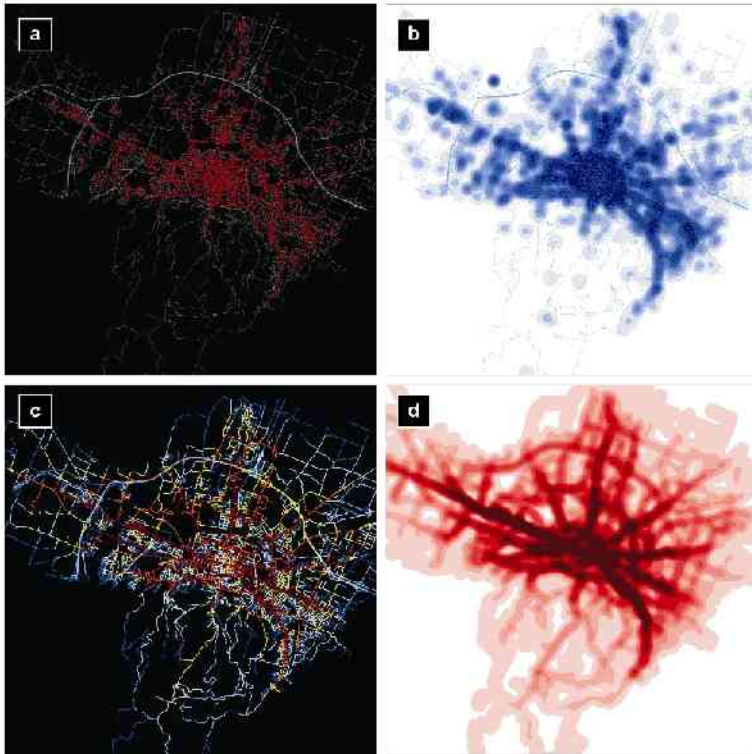


Emanuele Strano

Networks and the city

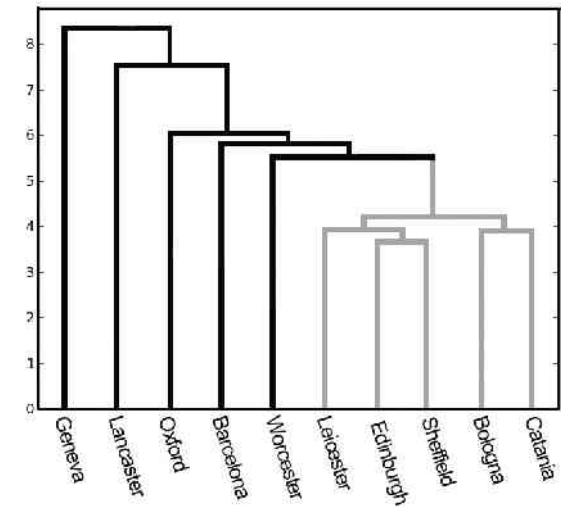
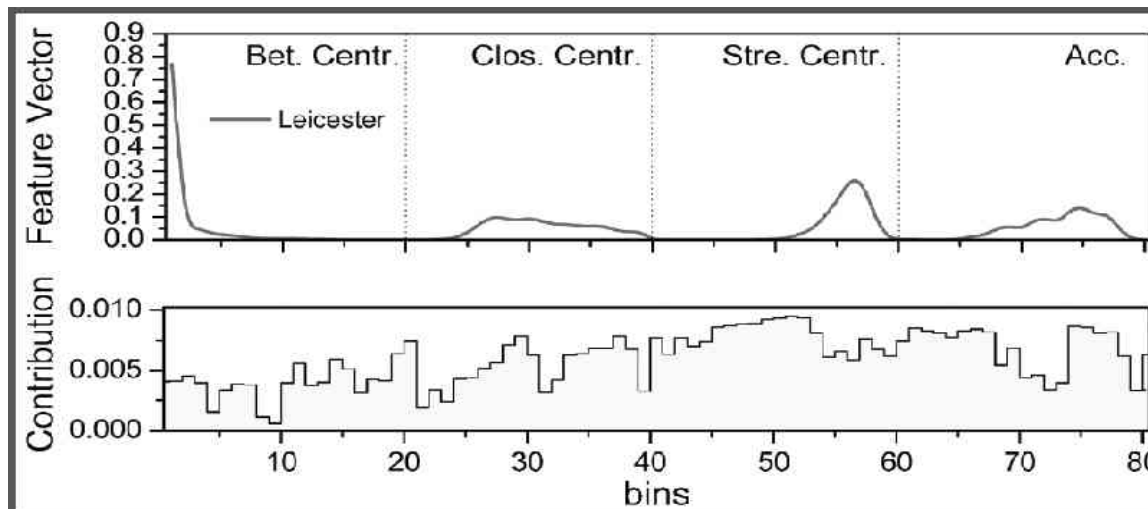
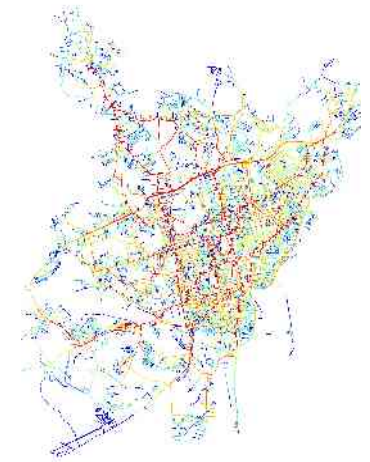


Centralities Vs Commerce



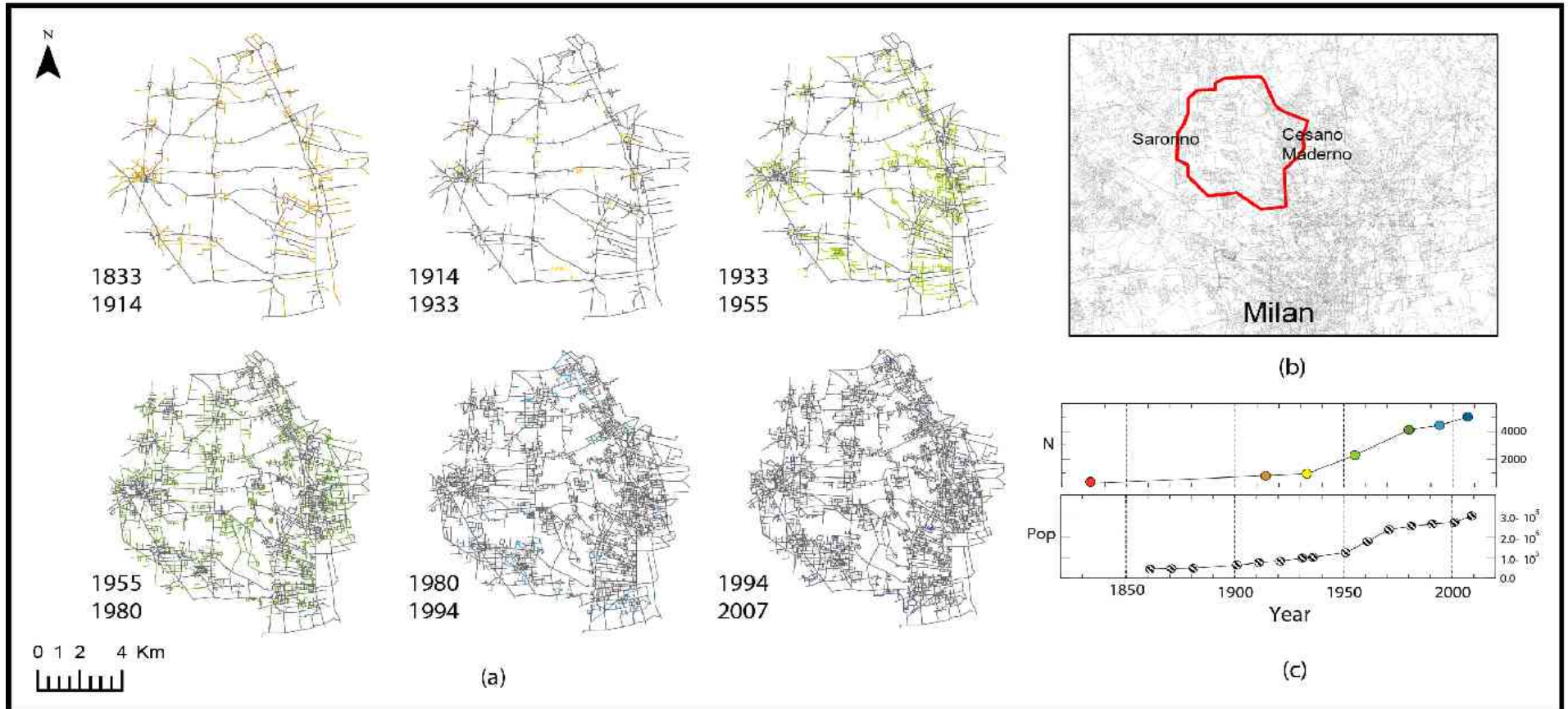
Porta, S. Latora, V. Wang, F. Strano, E. Cardillo, A. Scellato, S. Iacoviello, V. Messori, R. (2009) "Street centrality and densities of retail and services in Bologna, Italy". Environment and Planning B: Planning and Design.

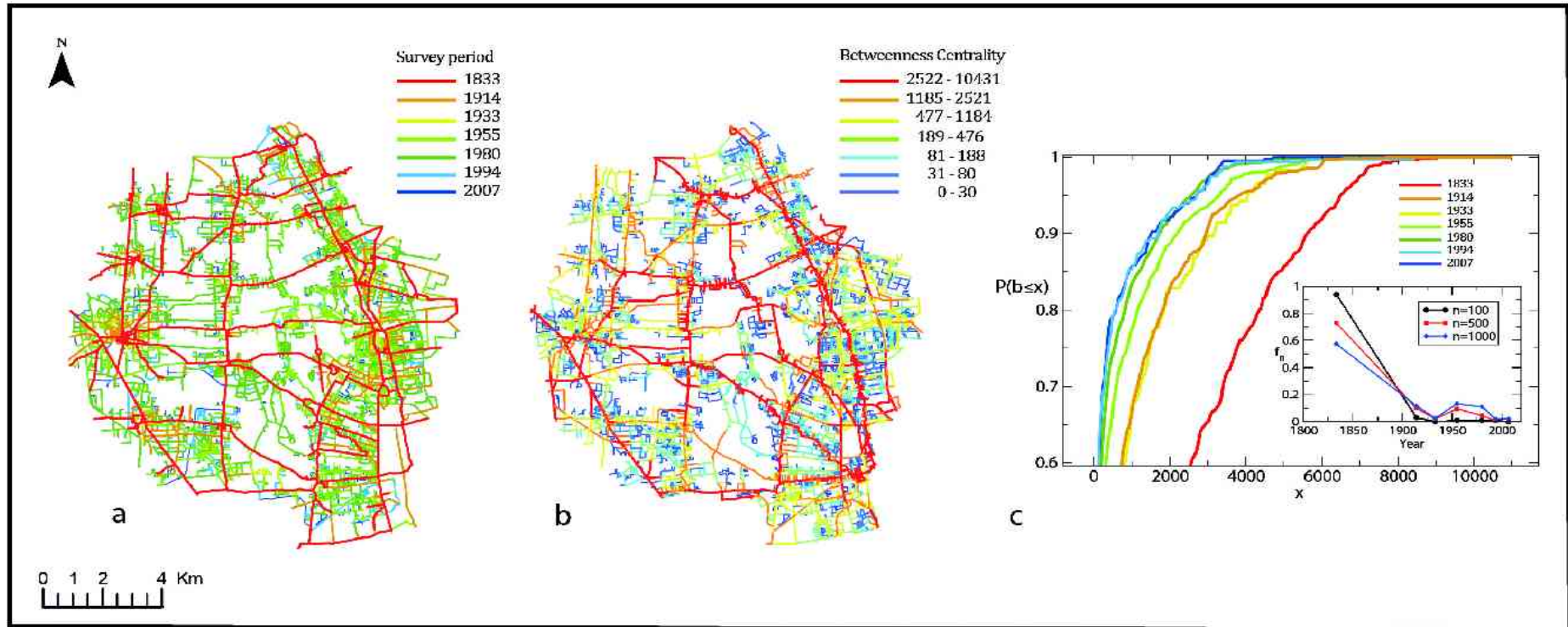
Classification of Cities



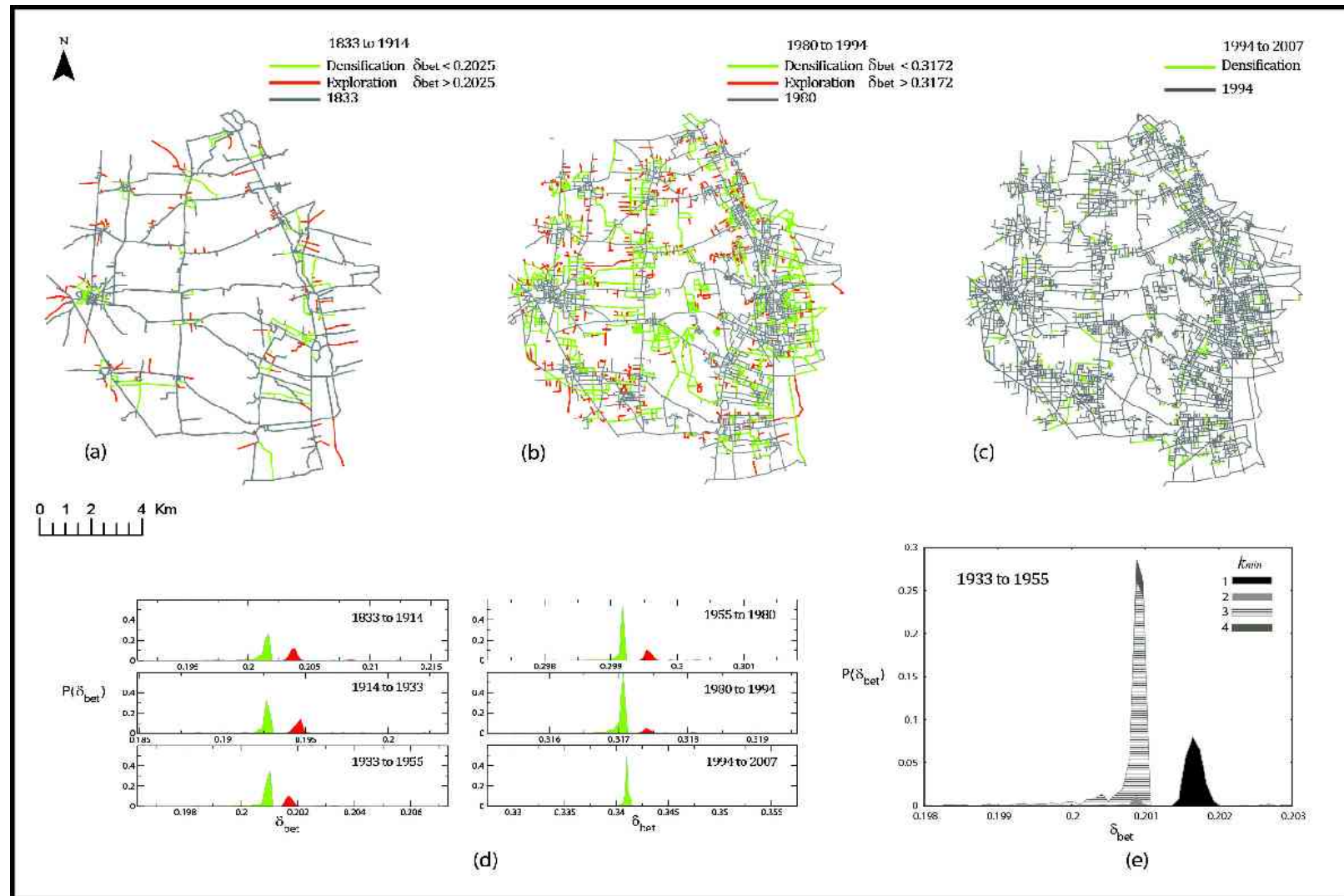
Strano et al, (2012) *Urban street networks: a comparative analysis of ten European cities*. Environment and Planning B, in print.

Land Frangmentation and Urbanization





$$Bc(e) = \frac{1}{(N-1)(N-2)} \sum \frac{\rho^{ij}(e)}{\rho^{ij}}$$



Strano, E. Nicosia, V. Latora, V. Porta, S. Barthelemy, M. (2012) *Elementary processes governing the evolution of road networks* Nature Scientific Reports. 2.

Remote Sensing and Network

Greater London case

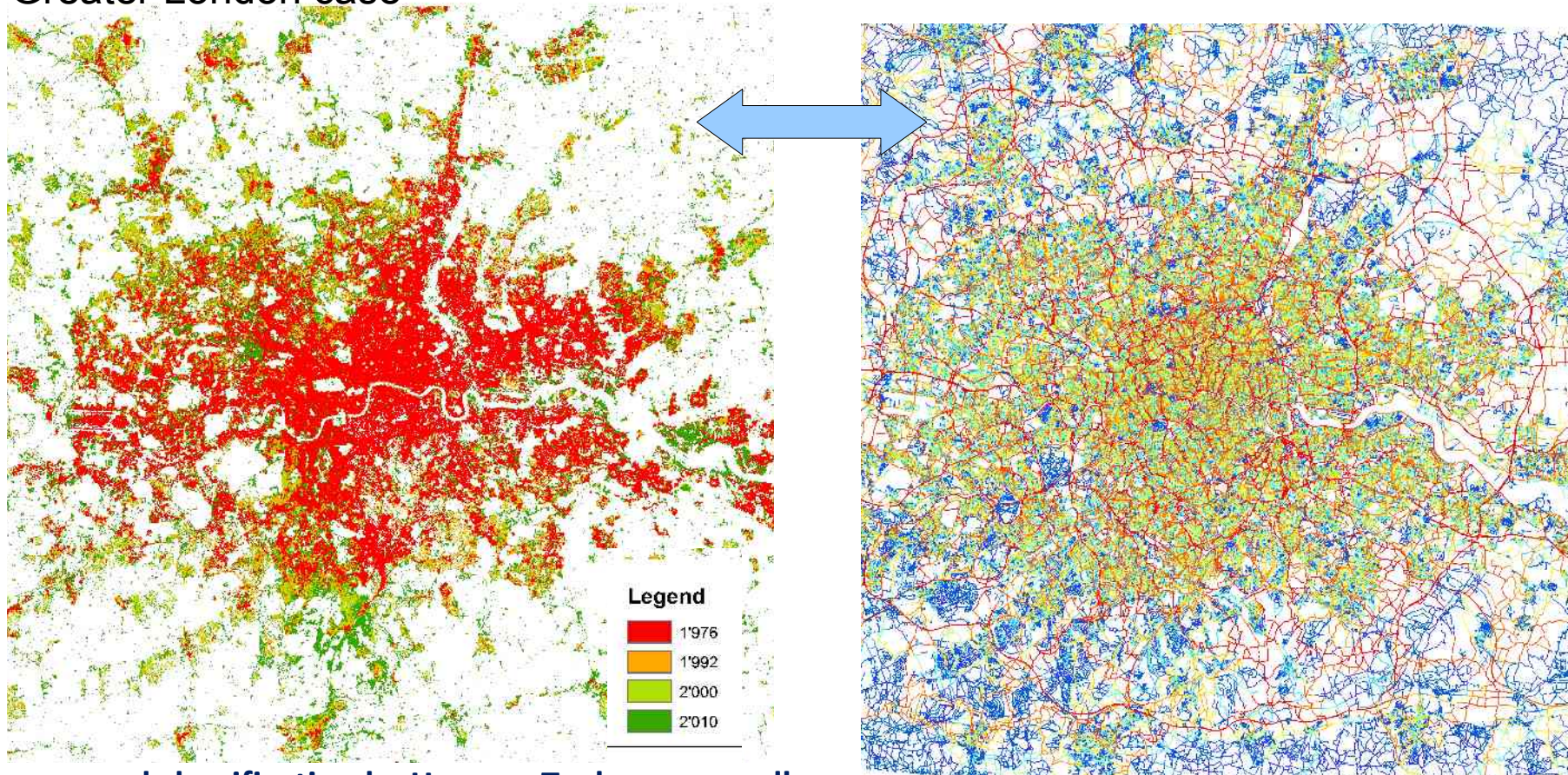
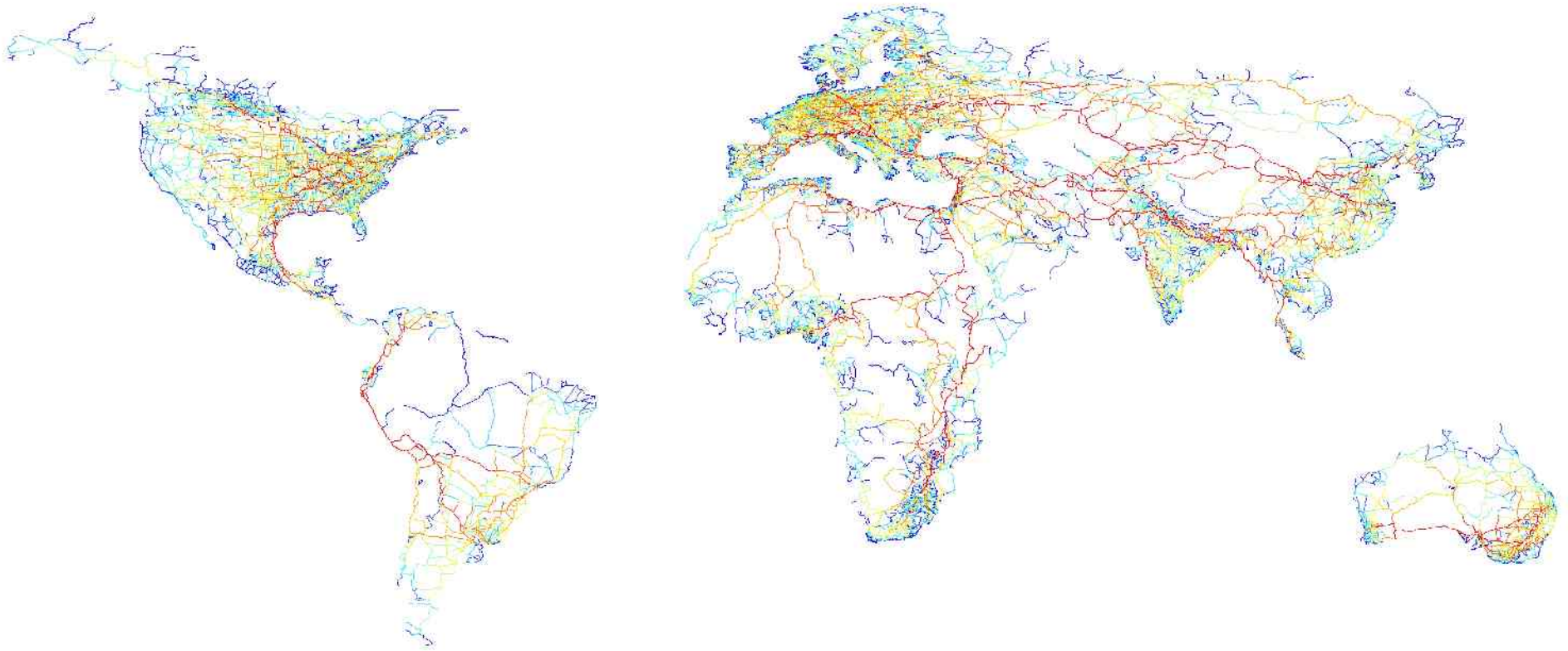


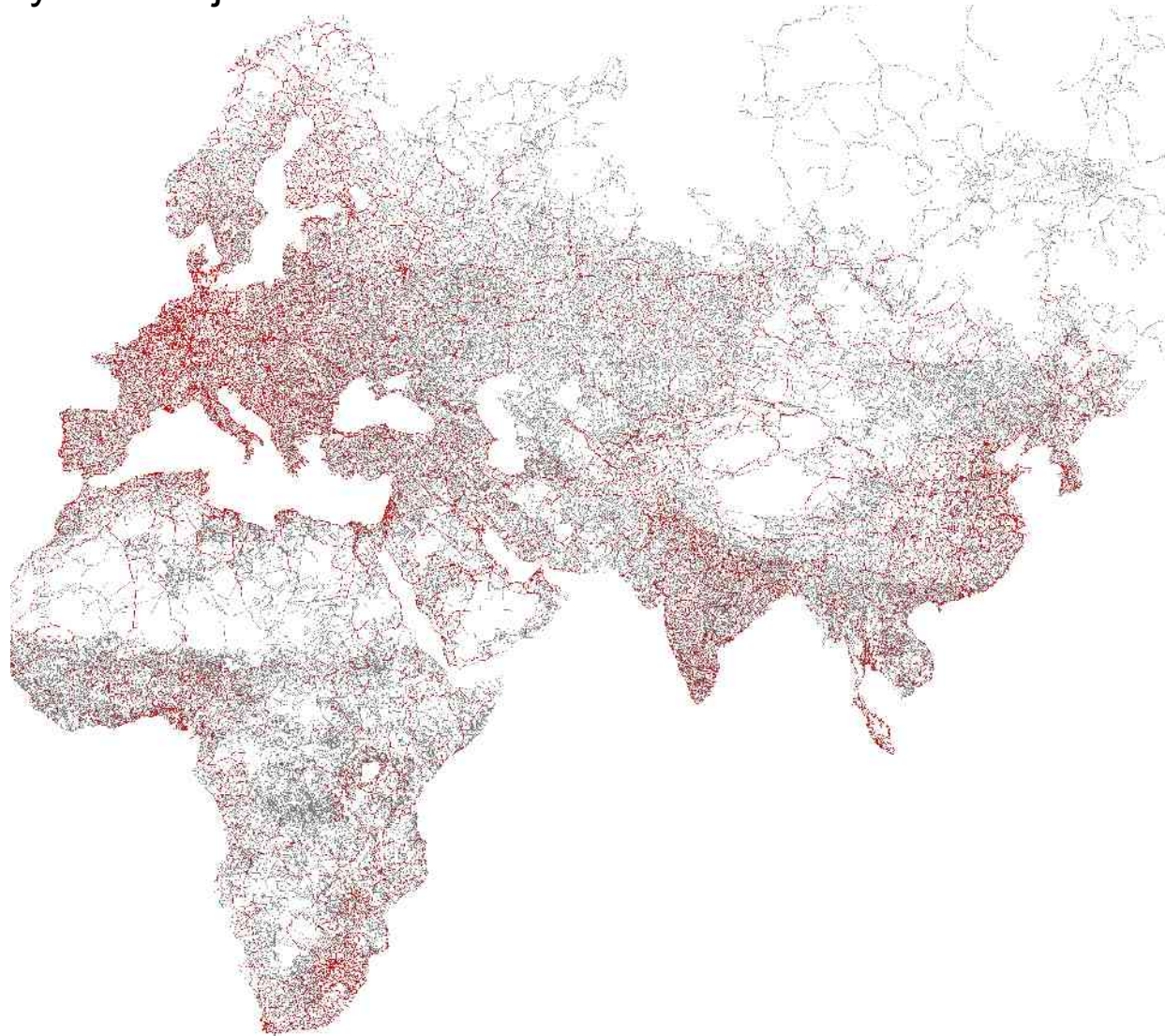
Image and classification by Hannes Taubenboeck, dlr.

Global land fragmentation

Global major road network



Secondary and major roads



Finally:

- Urbanization analysed solely with street networks analysis or land cover classification may underestimate the real figure.
- New methodological framework
- We are still far to understand and quantify the global land fragmentation process that is the first step preparing urbanization.
- Starting to study the phenomena at global level
- We urgently need to integrate Italian cook to the Swiss one.
- LaSig laboratory is working on this direction!

Thanks you