

Italian ragweed pollen inventory

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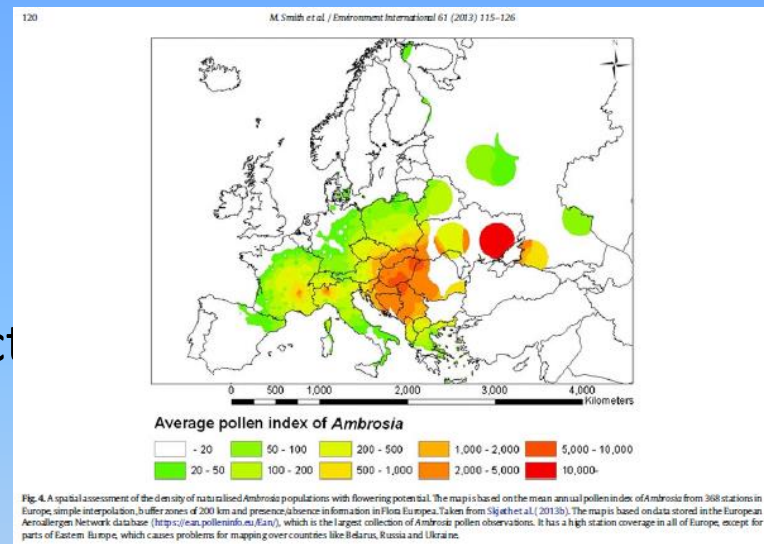
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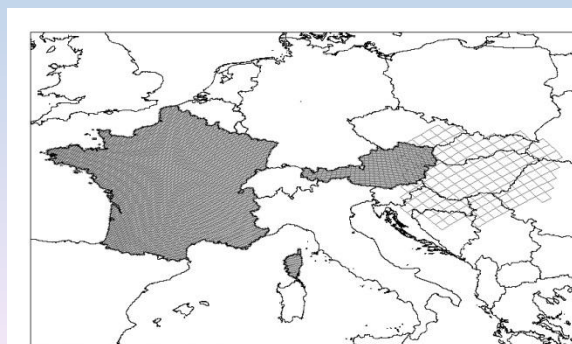
Background

- Inventories important
 - Presents overall status over large areas^[1]
 - Needed for numerical forecast models^[2]
 - Can be used for scenarios and impact cases, e.g. the ragweed beetle^[3]
 - Several inventory methods available^[2,4,5]
 - Pollen based inventories tend to produce best results for ragweed^[6]
 - Models very sensitive to data gaps in inventories (high emission areas!) and the overall quality^[4,6]



Background

- Current pollen based inventories:
 - Pannonian Plain^[5]
 - France^[7]
 - Austria^[8]
- Italy needed as it is a major source region in Europe^[1]



The three individual inventories

Agricultural and Forest Meteorology 150 (2010) 1203–1210

Contents lists available at ScienceDirect

Agricultural and Forest Meteorology

journal homepage: www.elsevier.com/locate/agrformet

A method for producing airborne pollen source inventories: An example of *Ambrosia* (ragweed) on the Pannonian Plain

Carsten A. Skjoth^a, Matt Smith^b, Branko Šikoparija^{c,*}, Alicja Stach^{d,1}, Dorota Myszowska^e, Idalia Kasprzyk^f, Predrag Radišić^g, Barbara Stjepanović^h, Ivana Hrga^h, Dóra Apatini^h, Donát Magyar^h, Anna Páldy^h, Nicoleta Ianoviciⁱ

Atmospheric Environment 83 (2014) 62–71

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Atmospheric Environment

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Ragweed pollen source inventory for France – The second largest centre of *Ambrosia* in Europe

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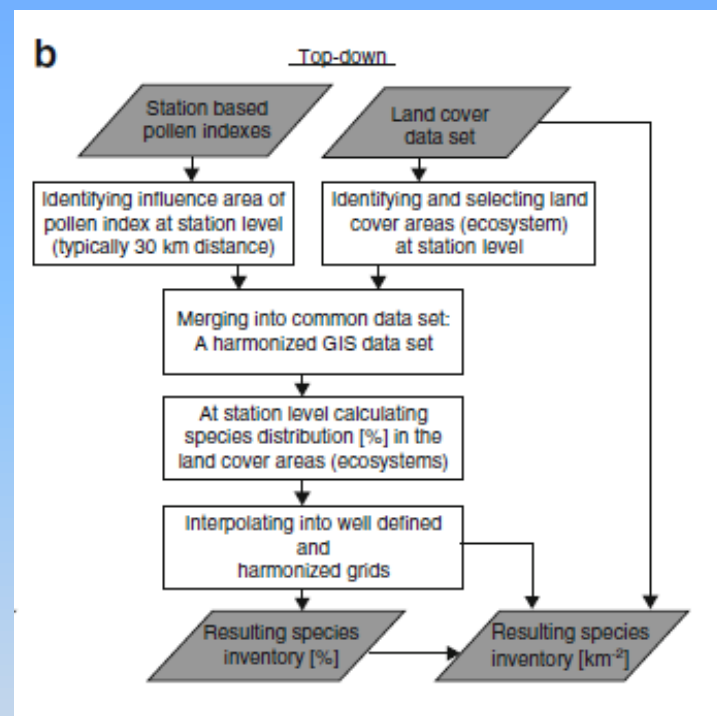
Ragweed (*Ambrosia*) pollen source inventory for Austria

G. Karrer^a, C.A. Skjoth^{b,*}, B. Šikoparija^c, M. Smith^{d,e}, U. Berger^e, F. Essl^{f,g}

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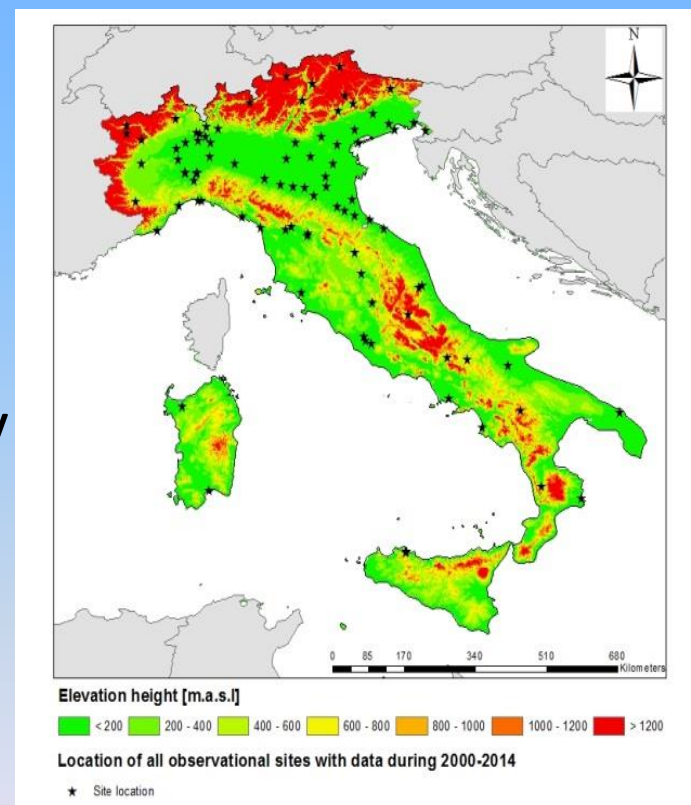
Concept

- Top-down approach
 - Use pollen data [5]
 - Knowledge on ecosystems [5,7]
 - Knowledge on local land use and its management [7,8]
 - Need land cover data, e.g. Corine Land Cover [9]
 - Can use elevation or climate data
- Advantages:
 - Can be done country by country [7]
 - No overarching rules- local adaptable [7,8]
 - Can estimate invasion boundaries [7]
 - Restricted by but not entirely dependent on ragweed ecology
- Disadvantages:
 - Limited by station coverage [10]
 - Extreme LDT episodes can skew results [7]



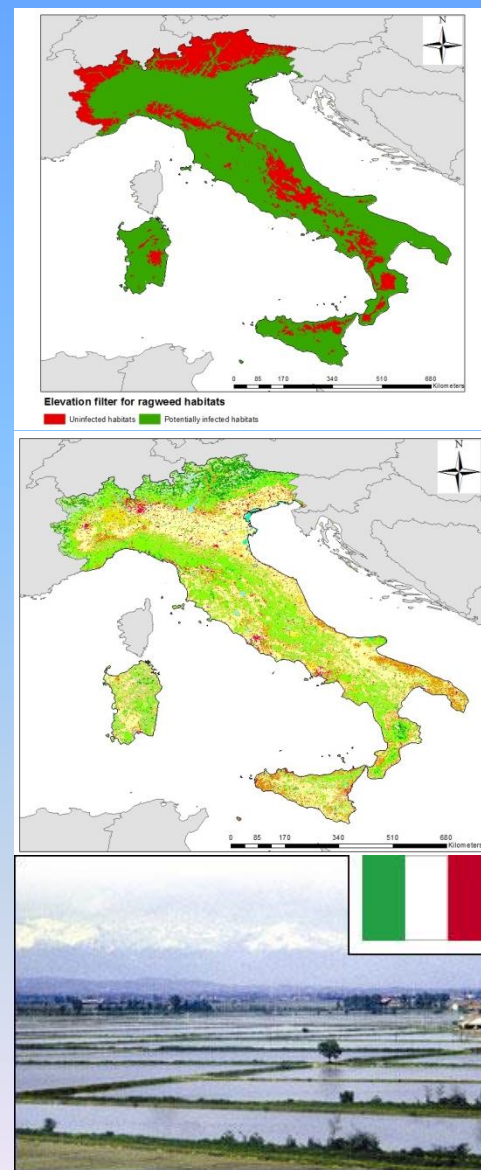
Input data

- Pollen data
 - Based on observations from volumetric pollen traps [11]
 - Observations follow standard methods in aerobiology
 - Use annual pollen index from daily mean concentrations
 - 92 stations available, all of Italy covered
 - 907 annual data sets available (1-32)
 - Data since 2000 entered into calculation (thus inventory cover)



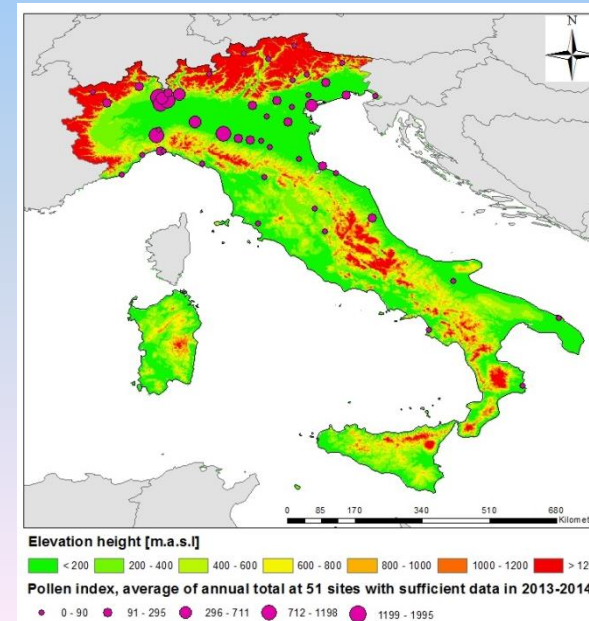
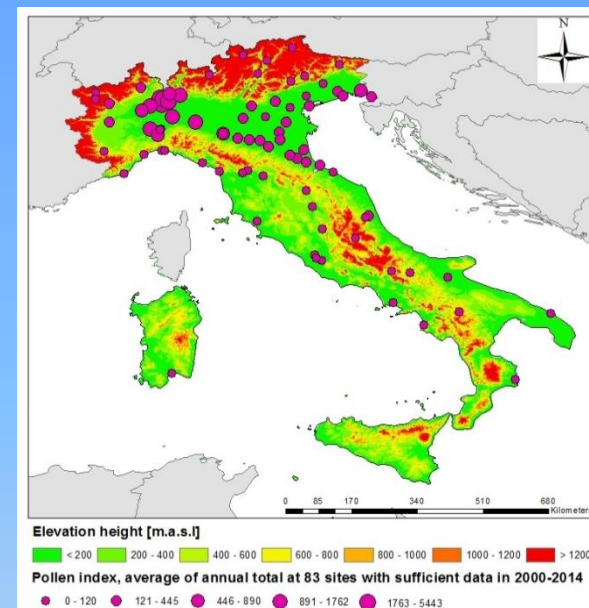
Input data

- Land cover
 - Corine Land Cover, 100m x 100m^[9]
 - A digital elevation model from NASA Shuttle Radar Topographic Mission, 90m x 90m^[12] to filter data
 - Local knowledge on infection in different land cover categories
 - Local knowledge on land cover management ^[13]



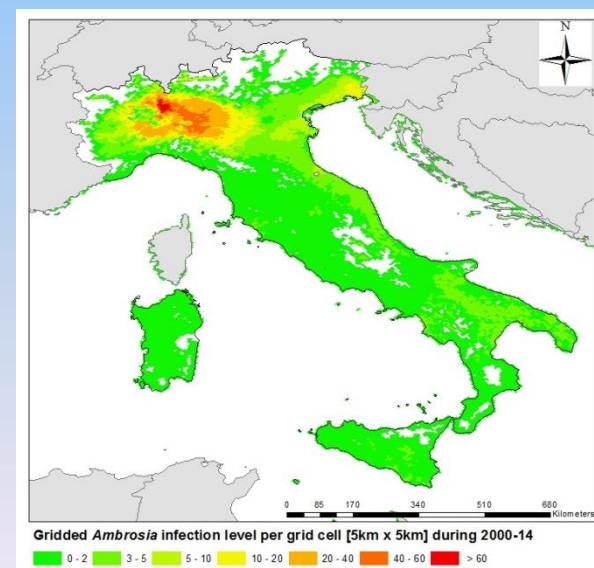
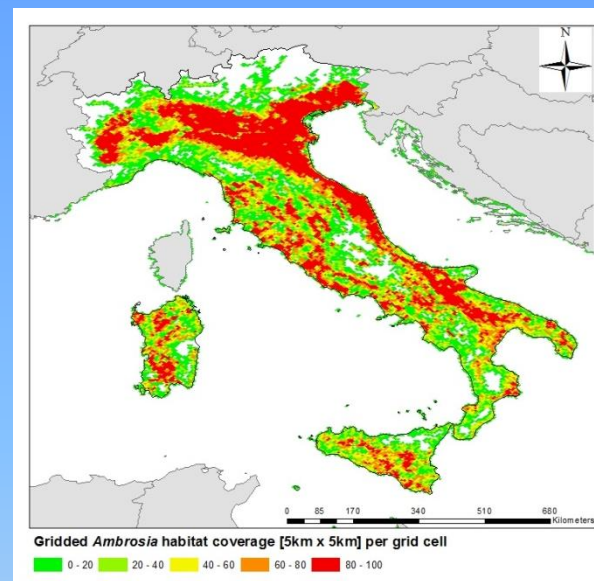
Results

- Mean pollen index at 83 sites
 - Index during entire period
 - Index until 2012
 - Index 2013-14
- Infection level at 83 sites
 - Infection level
 - Infection level until 2012
 - Infection level 2013-14



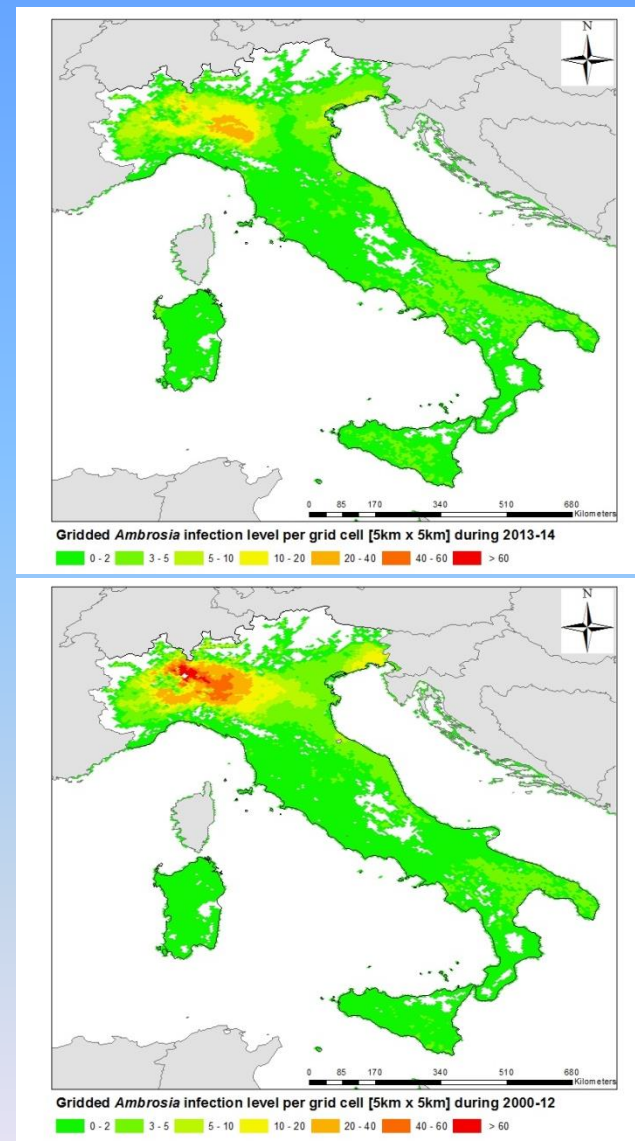
Results

- Gridded data
 - Density of ragweed habitats
 - Gridded Infection level in habitats
 - Mean infection level
 - Index during entire period
 - Index until 2012
 - Index 2013-14
 - Infection level at 92 sites
 - Infection level
 - Infection level until 2012
 - Infection level 2013-14



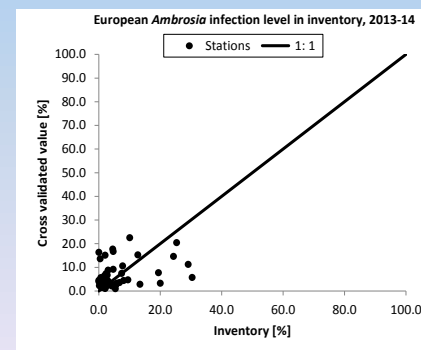
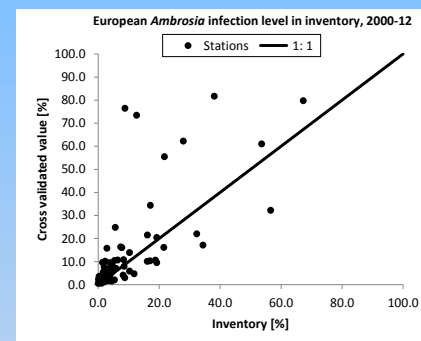
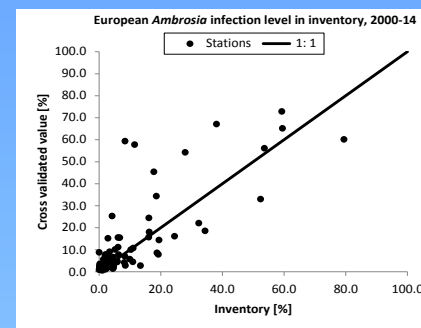
Results

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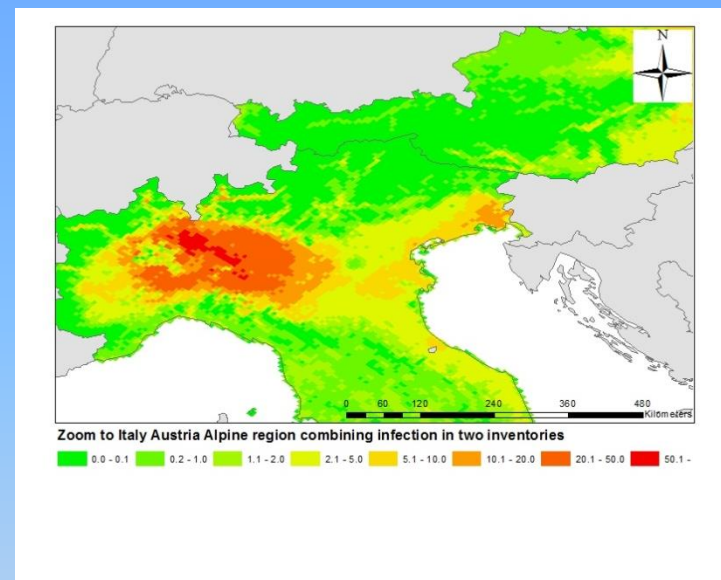
Results

- Validation?
 - All data go into inventory
 - Solution: cross validation
 - Several approaches
 - Leave-one-out procedure
 - Correlations: 0.78, 0.73 and 0.34



Discussion

- Inventory close a gap in identified important ragweed region
- Inventory can be combined with previous inventories
- Inventory robust due to the very large data set, cross validation important
- Inventory suggest spatial impact of ragweed beetle



Discussion

- Inventory limited by analytical approach
 - Atmospheric models and inverse modelling approaches can potentially improve results
 - Land cover data can be more detailed, but European-wide harmonisation very important. New land cover data from satellites (e.g.Sentinel-2) can be the answer.

Conclusion

- Inventory produced for Italy
- Final data set 5 km x 5km
- Final data set in kml and shape file format (INSPIRE)
- Data set can be used for scenarios and forecasting with numerical models.

Thank you for your attention

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