# Mapping the environmental health landscape in Switzerland

## A panorama of ongoing research from **Swiss TPH**

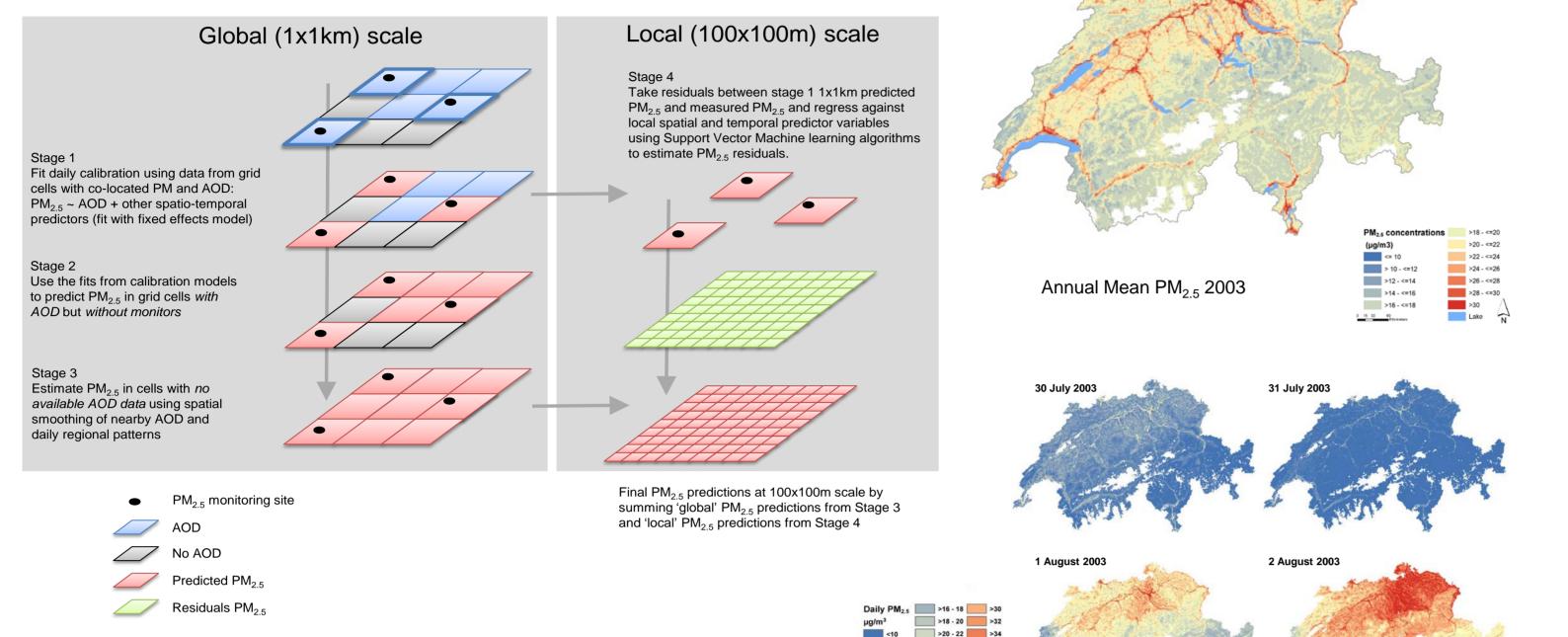
Danielle Vienneau, Kees de Hoogh, Marloes Eeftens, Martina Ragettli, Martin Röösli

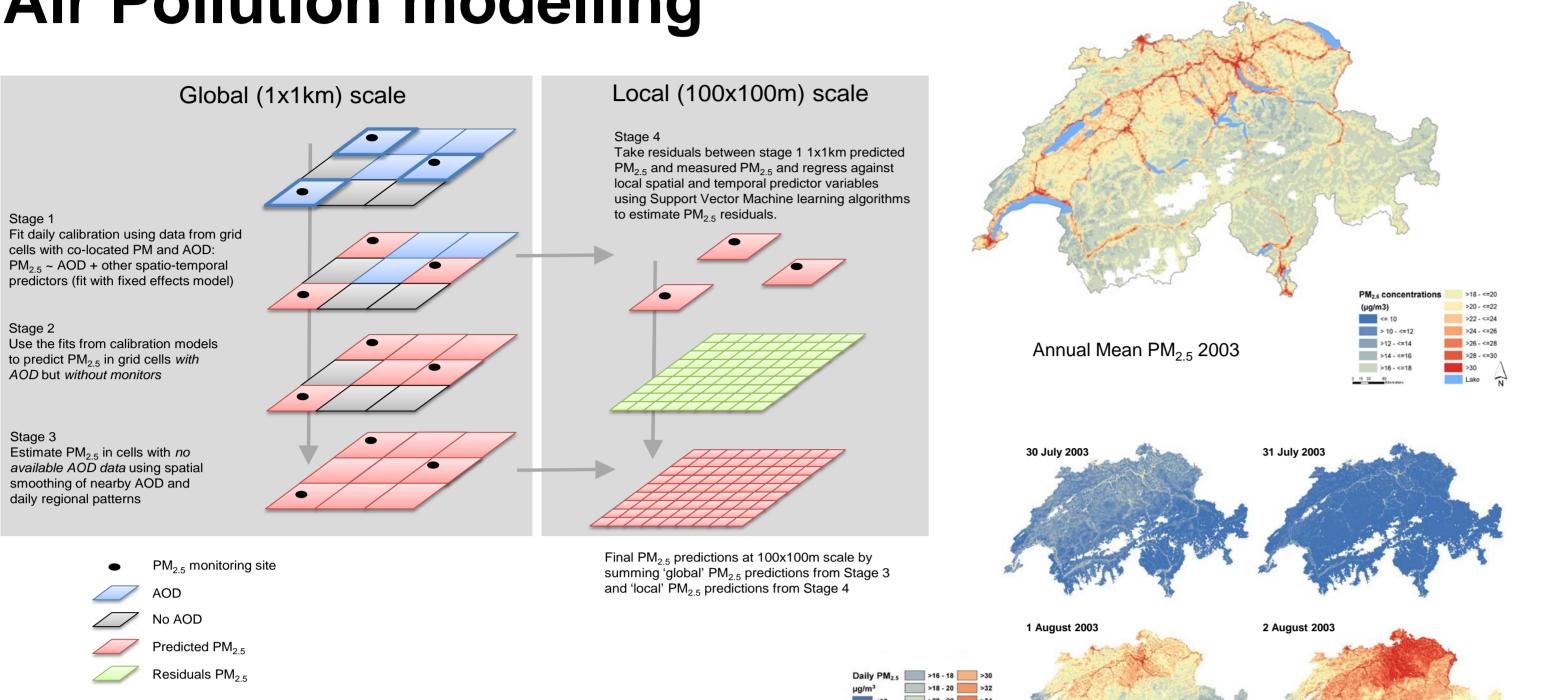


Swiss Tropical and Public Health Institute Schweizerisches Tropen- und Public Health-Institut Institut Tropical et de Santé Publique Suisse

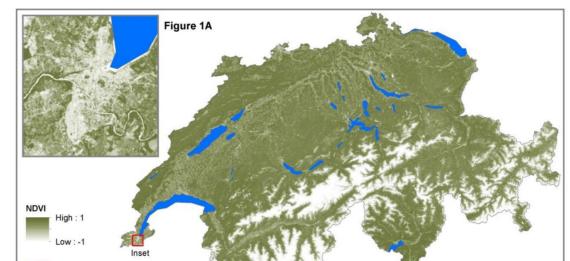
Associated Institute of the University of Basel

## **Air Pollution modelling**





## **Residential Green**



Major water bodie

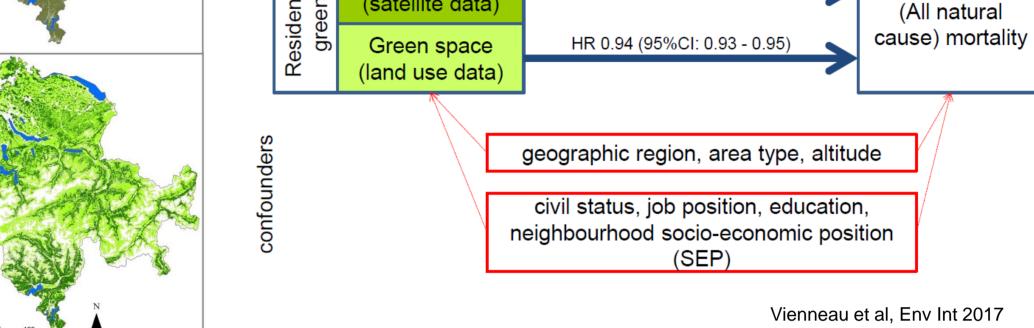
arce: NDVI, Landsat 8, U.S. C

Other land us

Major water bodi

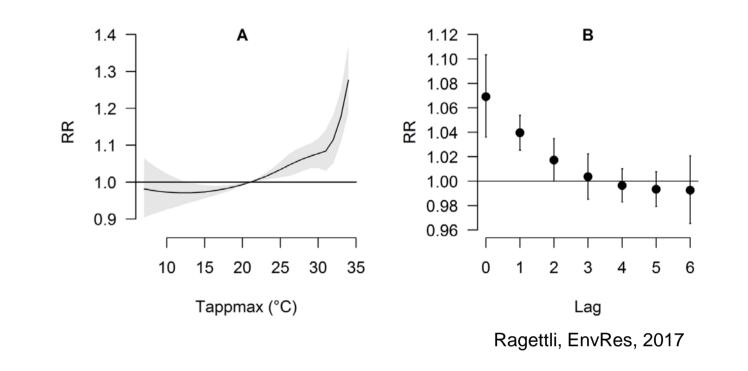
ource: swissTLM<sup>3D</sup> and Vector25, SwissTop

### DAG for the association between residential green and mortality Width of solid lines is proportional to the relevance of the pathway Air pollution ransportation noise HR 0.94 (95%CI: 0.93 - 0.95)



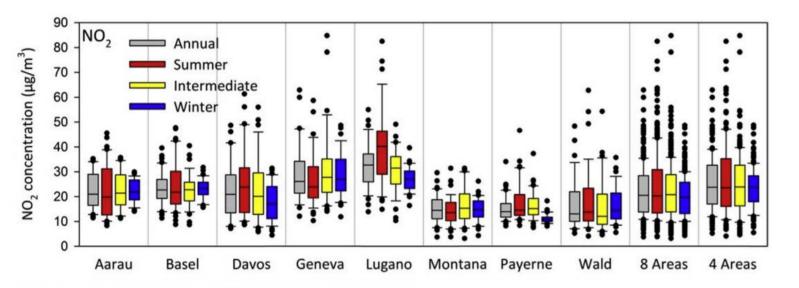
## Heat and Climate Change

Association between heat and mortality in Switzerland (1995-2013)



### Light at Night

### **Air Pollution measurements**

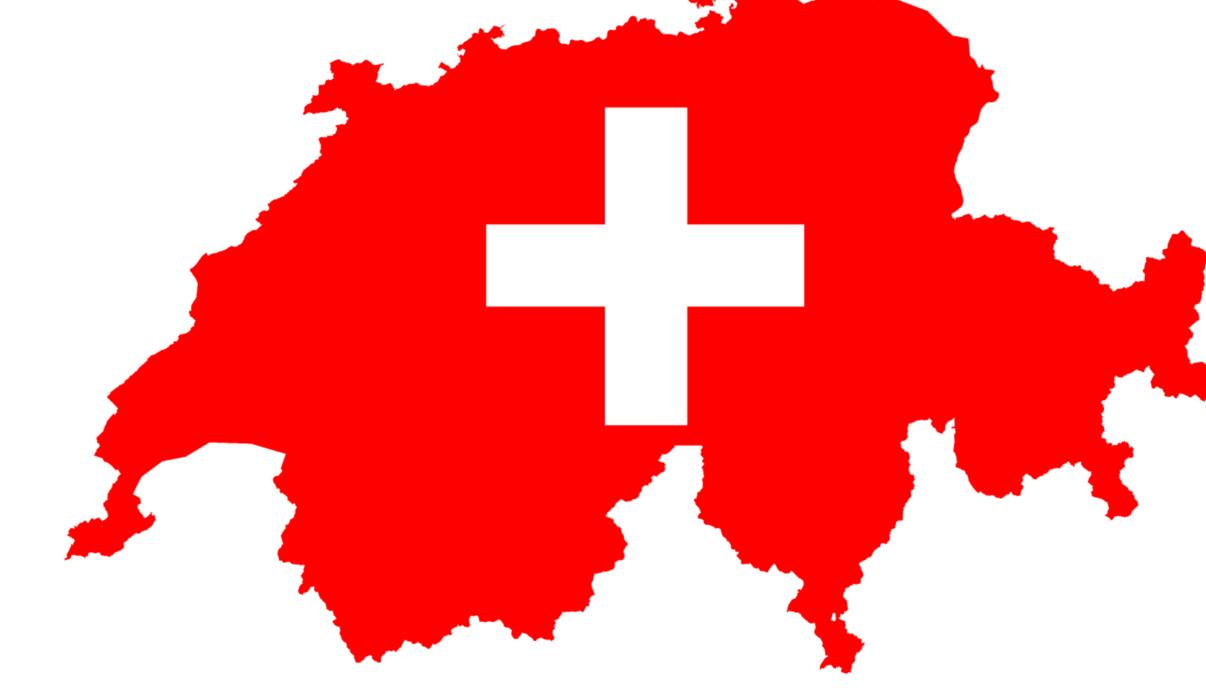


Measurements of NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>2.5</sub> absorbance, PM<sub>10</sub> and UFP in Switzerland PNC and LDSA were highly correlated with each other and with NO<sub>2</sub> and PM<sub>2.5</sub> absorbance. More spatial variance within than between study areas for NO<sub>2</sub> and PMcoarse, but not for other pollutants.

de Hoogh, Env Poll, 2018

Geneva Lugano Wald 4 Areas Basel

Eeftens et al. Atm Env 2015



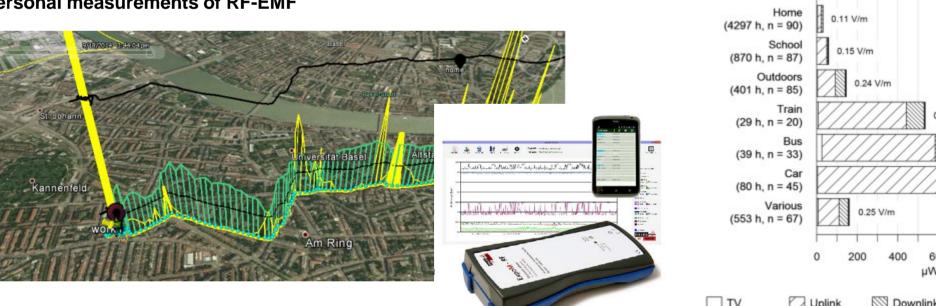
## **Electromagnetic Fields**

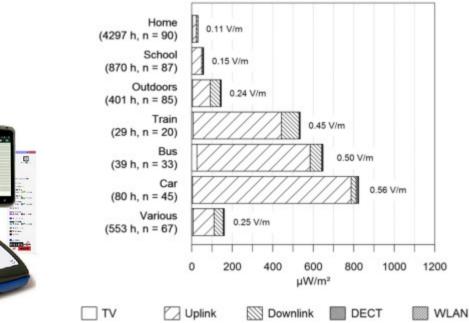
Personal measurements of RF-EMF

30000

20000

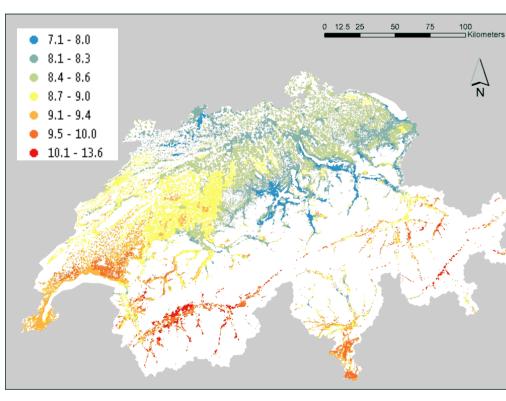
10000

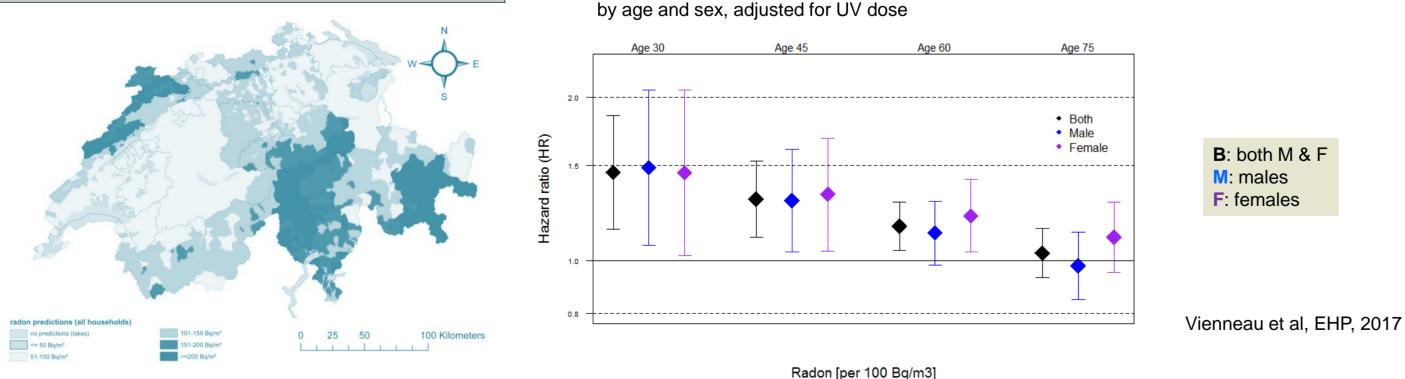




## UV / Radon

Roser et al, 2017

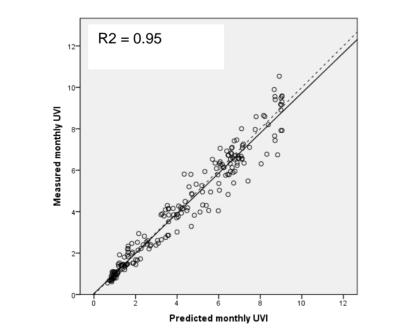




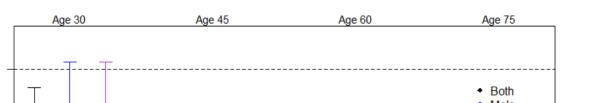
Mixed effect model for UV exposure Aggregated daily UVI from 4 available stations (MeteoSwiss) Monthly solar radiation ~2x2km (MeteoSwiss) Altitude raster

Convert to dose UVEry [in  $W/m^2$ ] = UVI / 0.4

Validated using UVI from later years



Effect of radon exposure (HR per 100 Bq/m<sup>3</sup>) on malignant melanoma



## Cohorts

### Swiss National Cohort (SNC)

- Longitudinal research platform
- Links census with data on births, emigration and mortality
- Near complete population coverage (7.29 mil in 2000)
- Individual, household and building records for each participant
- Geocoded at x, y and z

### **Basel Bern Infant Lung Development Cohort (BILD)**

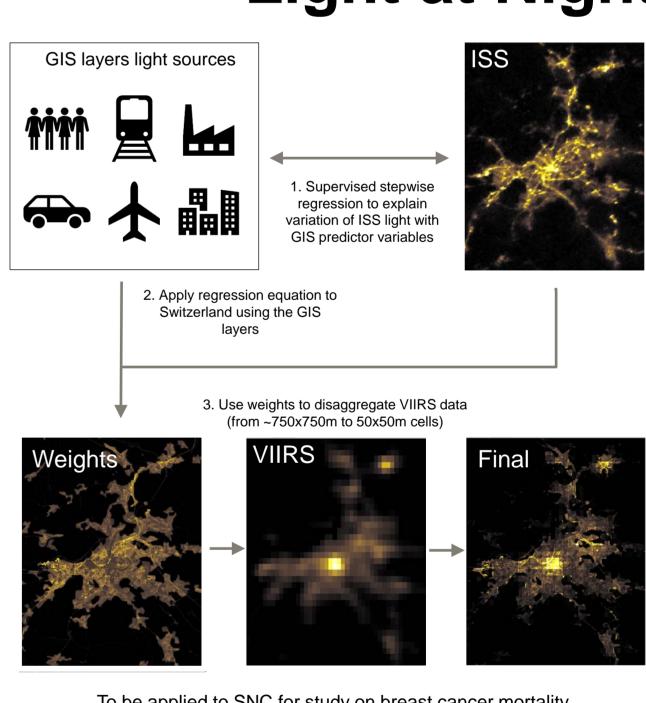
- Investigates the effects of genetics, environment and Western lifestyle on lung growth and development
- Explore subsequent consequences for later respiratory disease in early childhood
- Ongoing recruitment (ca. 620 in Bern and 280 in Basel)

### LuftiBus

- 56,223 individuals across Switzerland
- Lung function measurements and health information
- Plus demographic, geographical and environmental data

### **HERMES**

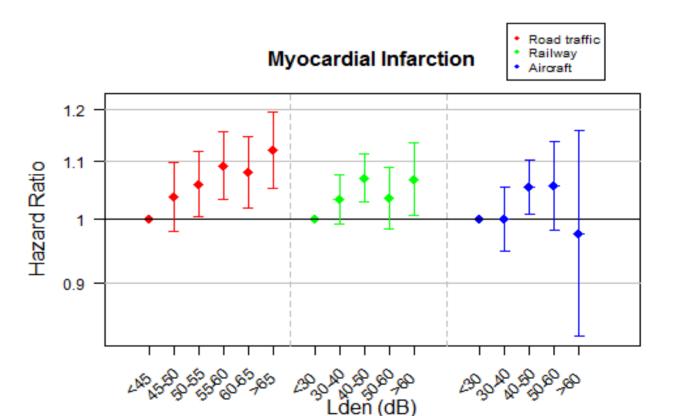
- Health effects (of mobile phone use) in adolescents
- 892 adolescents from central Switzerland and Basel
- Disentangling effects from radio frequency electro-magnetic fields, media use and transportation noise



To be applied to SNC for study on breast cancer mortality...









Modellierte Lärmbelastung in Basel Héritier, EJE, 2017 Data: Swisstopo, BAFU

Noise source L <sub>den</sub> Road	Excess risk per 10 dB(%) 4.0	95% CI	
		2.1	5.9
L <sub>den</sub> Railway	2.0	0.7	3.3
L <sub>den</sub> Aircraft	2.7	0.6	4.3

#### References

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- Héritier et al. 2017. Transportation noise exposure and cardiovascular mortality: a nationwide cohort study from Switzerland. Eur. J. Epidemiol. 32: 307-315
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- Roser et al. 2017. Personal radiofrequency electromagnetic field exposure measurements in Swiss adolescents, Env. Int. 99: 303-314
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