MODELLING THE USE PHASE
OF BUILDING MATERIALS
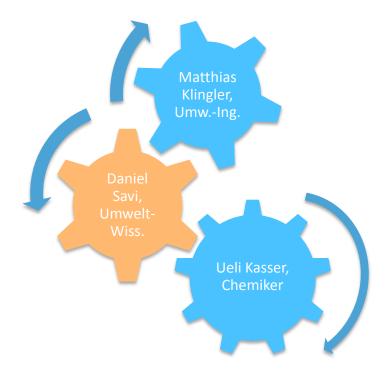
Approach and preliminary results

Clients: Bundesamt für Umwelt BAFU
               Stadt Zürich, Amt für Hochbauten

büro für
umweltchemie

BÜRO FÜR UMWELTCHEMIE

Matthias Klingler, Umw.-Ing.

Daniel Savi, Umwelt-Wiss.

Ueli Kasser, Chemiker

- Life cycle assessments
- LCA methodology development
- Ecological supervision of building projects
- Experts in materials ecology
- Surveys on harmful substances in buildings
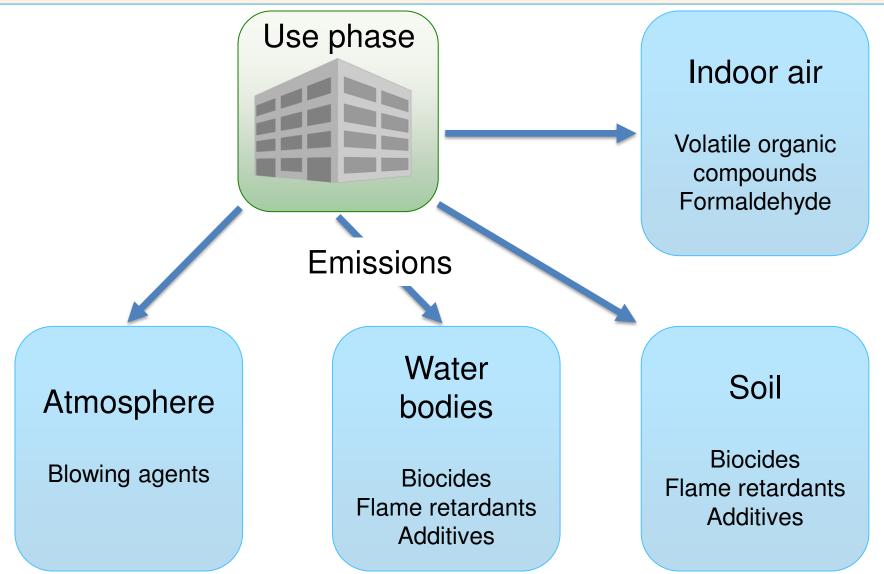- Indoor air measurements

TOPICS

– Relevant emissions during the use phase

– How to assess emissions from building products?

– Relevance of emissions during use phase

– Suggested new Eco-factors

– Preliminary conclusion

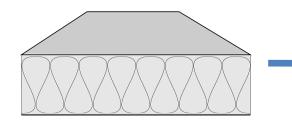# Relevant emissions during use phase

Use phase

Emissions
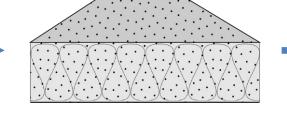
Indoor air

Volatile organic compounds
Formaldehyde

Atmosphere

Blowing agents

Water bodies

Biocides
Flame retardants
Additives

Soil

Biocides
Flame retardants
Additives

How to assess emissions during use phase?

Building material

Pollutant content

Harmful substances are not fully declared

Emissions

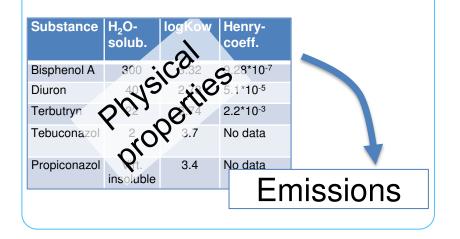No thorough measurments available for use phase

From pollutant content

How big is the share of substance's emissions?

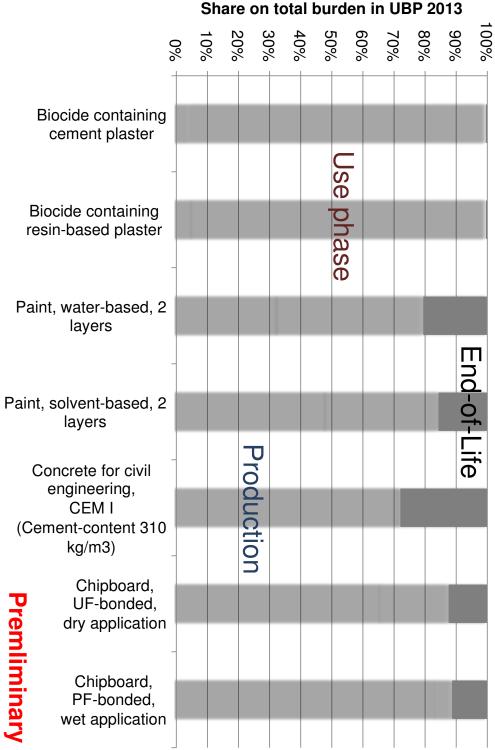| Substance	H$_2$O-solub.	logKow	Henry-coeff.
Bisphenol A	300	3.32	9.28*10^{-7}
Diuron	40	2.5	5.1*10^{-5}
Terbutryn	22	3.74	2.2*10^{-3}
Tebuconazol	2	3.7	No data
Propiconazol	Virt. insoluble	3.4	No data

Physical properties

Emissions

From test chamber emissions

How to extrapolate emissions from test chamber to use phase?

– Concentration over time but
– Reaction products are not well reflected

COMPARISON OF CONTRIBUTIONS

Share on total burden in UBP 2013

Use phase

End-of-Life

Production

Premliminary results!

Biocide containing cement plaster

Biocide containing resin-based plaster

Paint, water-based, 2 layers

Paint, solvent-based, 2 layers

Concrete for civil engineering, CEM I (Cement-content 310 kg/m3)

Chipboard, UF-bonded, dry application

Chipboard, PF-bonded, wet application

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

büro für Umweltchemie

SUGGESTED NEW ECO-FACTORS

Two important gaps:

– Emissions to indoor air cannot be assessed with existing Eco-Factors.

  – The study suggests a methodology to calculate Eco-Factors for indoor air emissions.

– Biocides emitted from construction materials have to be assessed by Eco-Factors for plant protection products.

  – A new methodology may be suggested, depending on funding

CONCLUSIONS

PRELIMINARY CONCLUSIONS

– The long-term use phase of building products can affect LCA results in certain cases

– Data on emissions over longer time periods is missing for almost all building materials

– Emissions had to be estimated on a rather weak data base

– Eco-Factors could be improved for assessing building products