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# **COSMO-ART and pollen: current developments**

Katrin Zink and Andreas Pauling

COSMO User Workshop, 27.11.2013



# Numerical pollen forecasts

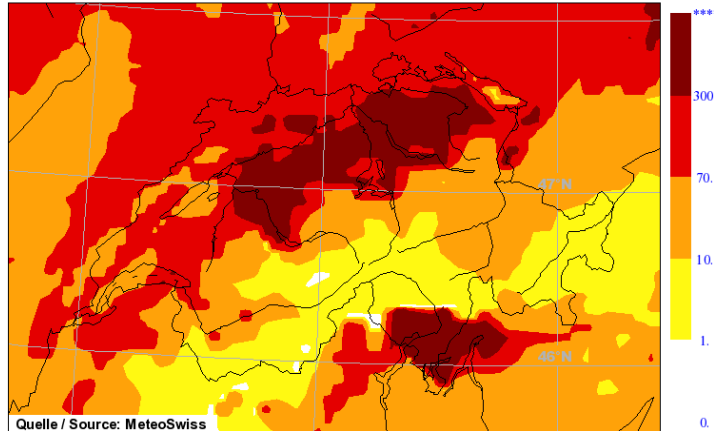
Gesamtpollenbelastung  
Prognose: Mittwoch, 14.03.2012



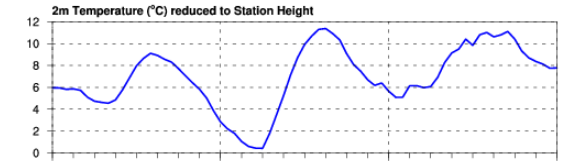
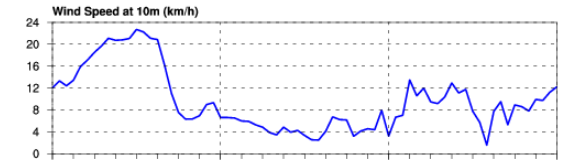
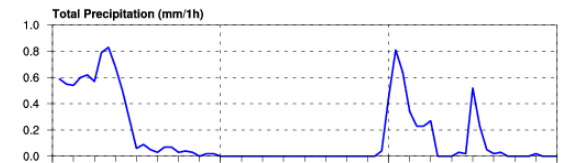
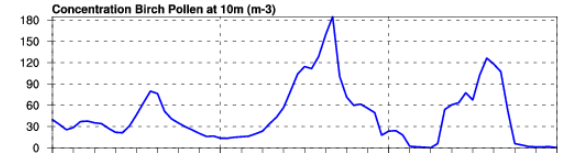
@MeteoSchweiz



COSMO-7 Forecast for: Tue 17 Apr 2012 14 UTC      Version: opr 7km (917)  
Birch Pollen Concentration      Maximum: 5326m-3      Run: 16.04.2012 00UTC+38h



COSMO-7 Pollengram      2012-04-16 00 UTC  
Basel 47.56N 7.58E 273m (COSMO-7 286m)

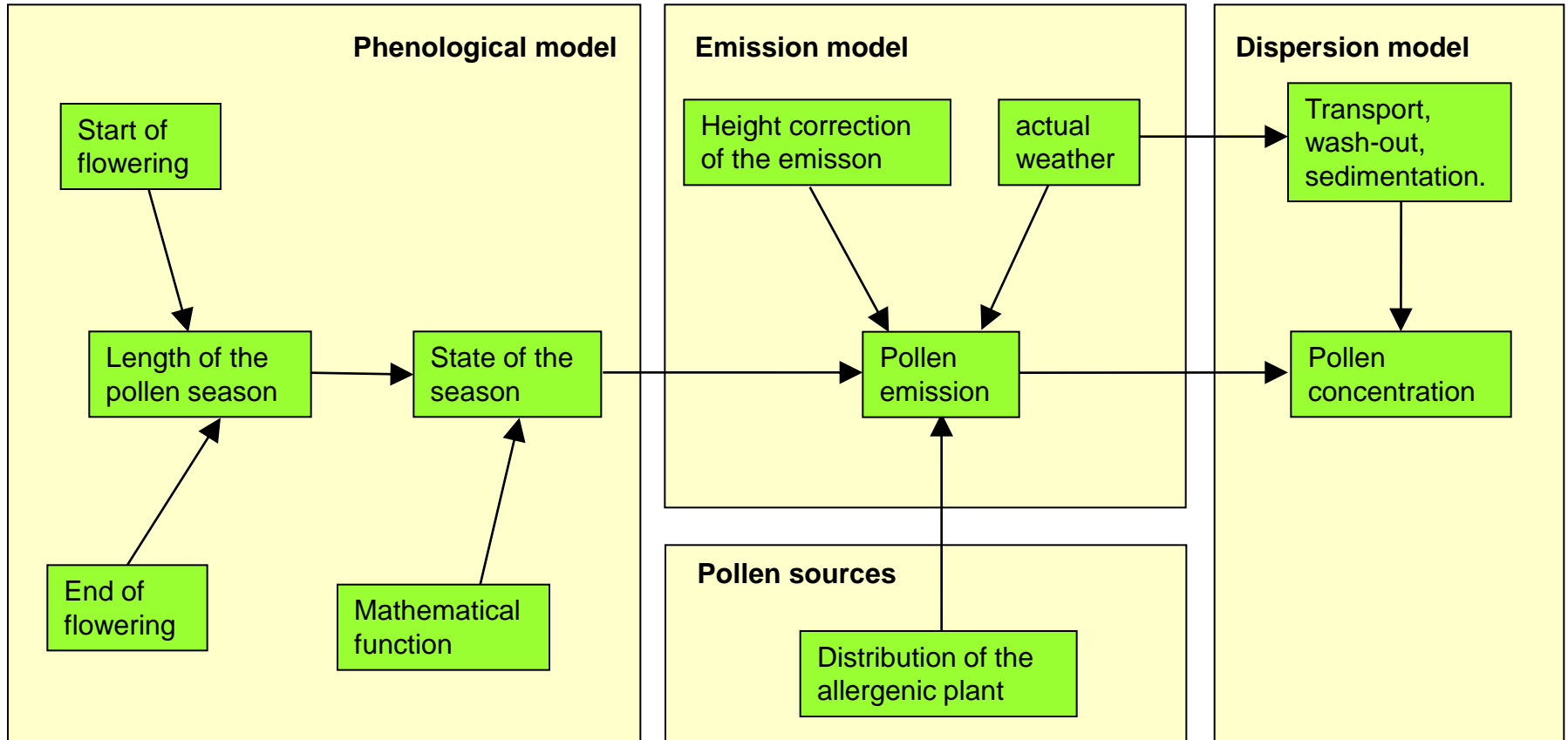


MON 16      TUE 17      WED 18  
APRIL 2012

Mon Apr 16 02:03:54 UTC 2012 / © MeteoSwiss



# What do we need?

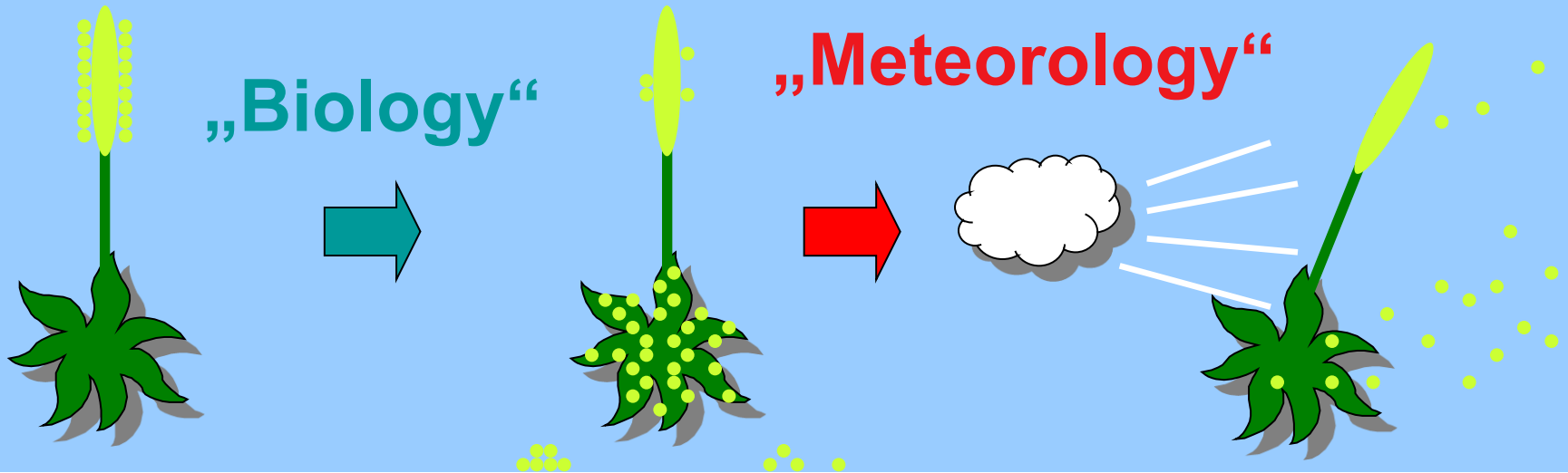




# Parameterizing pollen emission

Two steps using a „pollen reservoir“:

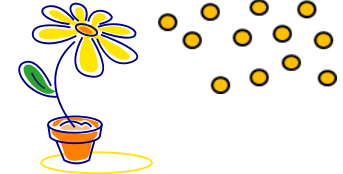
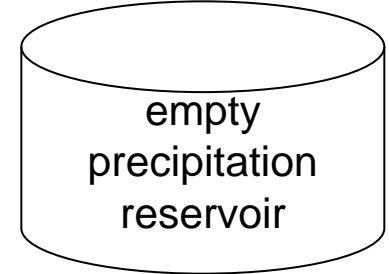
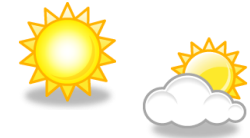
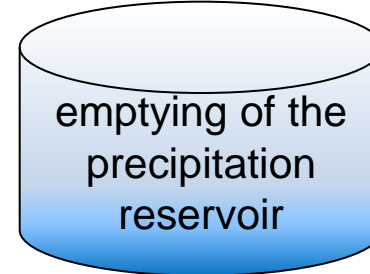
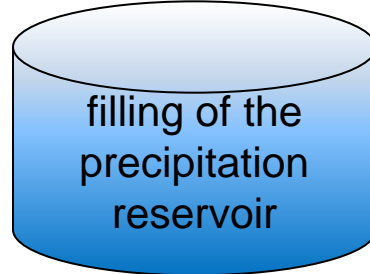
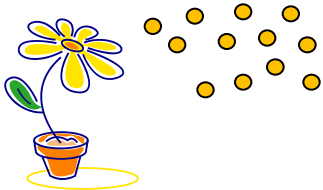
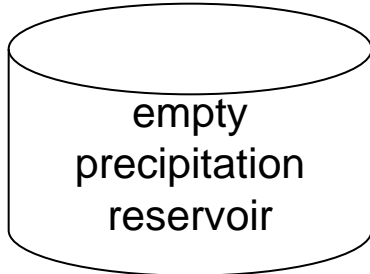
1. Release of the pollen from the flower. Filling of the reservoir.  
„Biology“
2. Emission of the pollen from the reservoir into the atmosphere.  
„Meteorology“



Zink K, Pauling A, Rotach MW, Vogel H, Kaufmann P, Clot B (2013). EMPOL 1.0: a new parameterization of pollen emission in numerical weather prediction models. *Geosci Model Dev* 6(6), 1961-1975. DOI:10.5194/gmd-6-1961-2013. URL <http://www.geosci-model-dev.net/6/1961/2013/>



# Precipitation memory



As long as it rains in the model, the precipitation reservoir is being filled. Maximal content is 1 mm.

The drying rate depends on the relative humidity.



# Estimating the strength of the birch pollen season

- Number of catkins varies from year to year  
=> number of pollen emitted varies as well from year to year  
=> number of catkins needs to be estimated
- Number of catkins dependent on weather conditions of the previous year.  
Which (weather) parameters influence the number of catkins?
- Based on stepwise regression 8 variables proved to be meaningful (based on Temp, Prec, sum of pollen counts of the past two years, 12 Swiss stations 1991-2012)  
=> multiple regression equation that can be used to calculate the strength of the next pollen season (tuning factor in the emission parameterization in COSMO-ART)



# Quality of the distribution maps

**Unpublished results.**

**Please contact Katrin Zink  
([katrin.zink@meteoswiss.ch](mailto:katrin.zink@meteoswiss.ch)) in case of interest.**



# Statistical results

**Unpublished results.**

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# Total amount of plants

**Unpublished results.**

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# Long-distance transport from Hungary

**Unpublished results.**

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# Thank you for your attention!

Questions?