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## Vattenwebb:

# A transparent service to support decision makers in achieving improved water status.





#### Vattenwebb.smhi.se

- Supports the Swedish authorities to with data in order to fulfill the Water Framework Directive.
- Simulation data form the S\_HYPE model
- Discharge and water quality
- Hindcast and climate
- Designed together with users from the water authorities



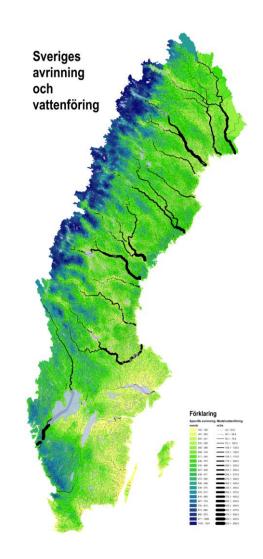




## Outline

- HYPE and S-HYPE
- Overview of the service
- Design principles
- Transparency
- Agile development
- Conclusion

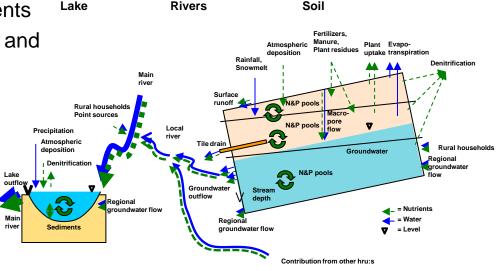






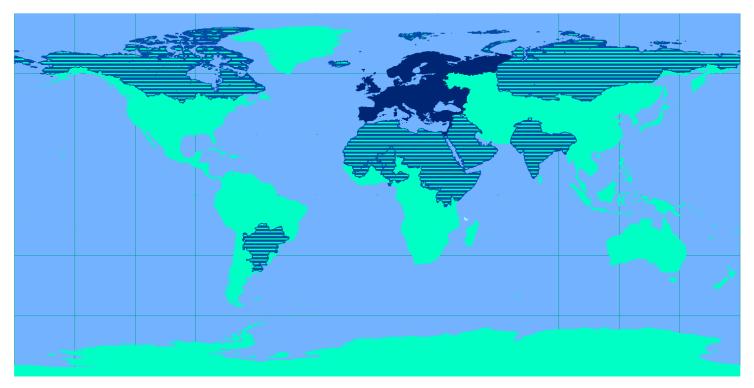
# Hydrological Predictions for the Environment (HYPE)

- Model for simulation of fresh water flow and water quality
- uses well-known hydrological and nutrient transport concepts
- used for both small and large scale assessments of water resources and status.
- has been applied for several continents
- used for characterization, forecasts, and scenario analyses.





#### Large Scale models in HYPE



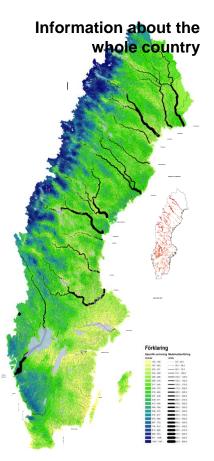
**Dark blue** = Operational HYPE model (daily forecasts) **Stripes** = HYPE model application

http://hypeweb.smhi.se/



#### S-HYPE 2012

- The most recent HYPE model of Sweden
- Available since march 2013





#### Facts about S-Hype 2012:

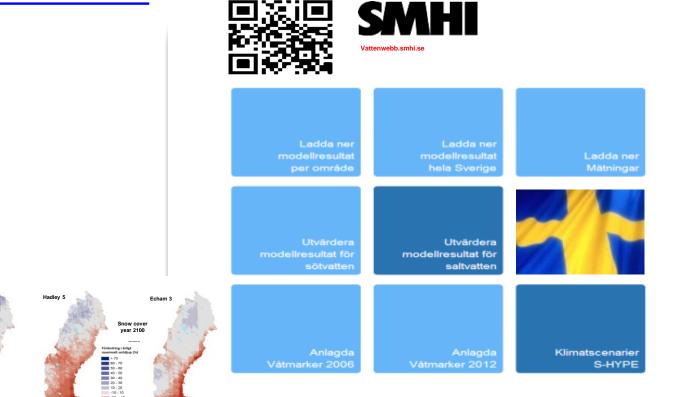
- Models Sweden and inflow areas from Norway and Finland.
- 244 main basins
- ~37000 subbasins based on (SVAR)
- 7 km<sup>2</sup> median subbasin size
- The model contains information about, for instance, soil, landuse, crops, point sources, water quality and regulations fetched from a large number of databases.
- The calibration procedure consist of a global step and regional fine tuning.

Total area (km²):	525 000
No. of sub- basins:	~37000
No. of discharge stations:	303
Topography:	SVAR (SMHI)
Land Use:	CORINE, SVAR (Lakes), and SJV (agriculture)
Soil:	SGU (Geological Survey of Sweden)
Discharge observations:	SMHI
Precipitation:	PTHBV (SMHI)
Temperature:	PTHBV (SMHI)
Lakes and reservoirs:	SVAR (SMHI)
Point sources:	FUT environmental monitoring (SMED)
Crop types:	SCB (Statistics Sweden)

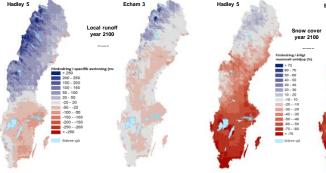


#### An overview of the service

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#### **Climate projections**





#### **Design process**

- The main users of the site are the Swedish water authorities and municipalities
- Users participate in development by
  - Suggesting new features
  - New features prioritized by operational group involving users
  - Reference groups for a specific application



**SMHI** 

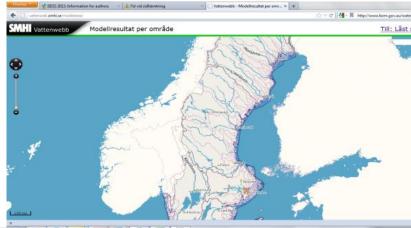
## **Design principles**

- Data available as the user needs it
- Easy to import data into other tools
- Transparency of the model
- Agile Development

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SMH Vattenweb	Modellresultat hela Sverige		Till: L	åst modellversion
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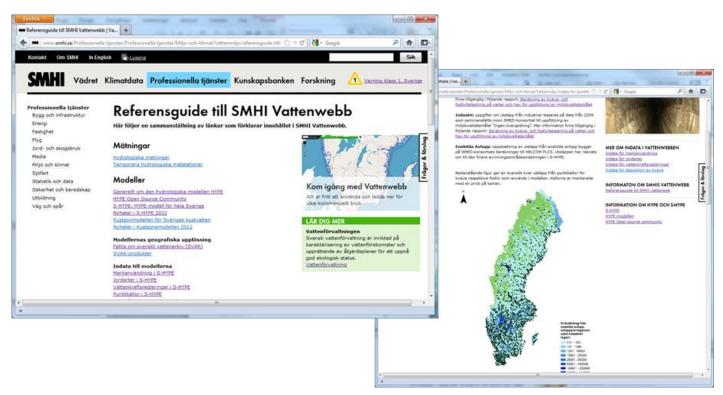
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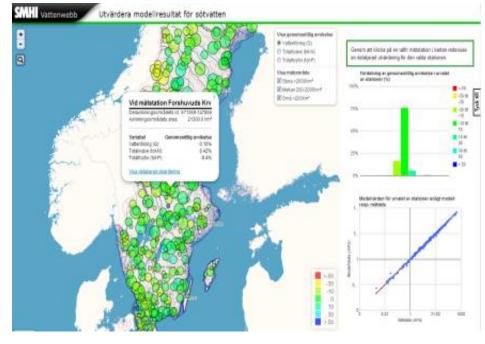
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# **SMHI**

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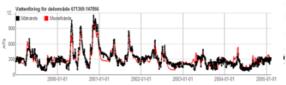
#### Vid mätstation Forshuvuds Krv

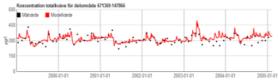
Delanimingsonrådets id. 671363-147866 Animingsonrådets æsa 21300.0 km²

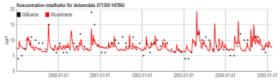
Variabel	Medelvarde matdata	Medelvarde modell	Genomsnittlig avvikelse
Vatienbring (Q)	304.02 mHs	294.44 mfts	-3.15%
Totalicave (tot-N)	310.45 µg/l	339.7 µg/l	3.42%
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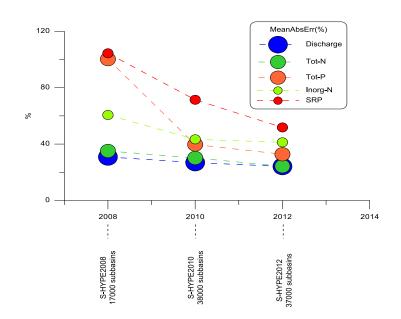


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#### **Agile model development**

- Start with the large picture, fill in the details
- Gradually improve the model, but make the best possible estimation at each point.
- Water and water quality support each other to improve the model.
- Continuous improvement the next model version will always be the best.

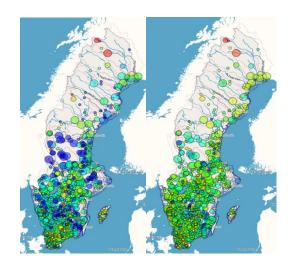




## **Agile web site development**

- Publish versions often get user feedback
- Design of the site
  - Many applications few dependencies
  - Data storage that supports model changes
- Applications on the site improves model development
- User feedback improves
  - Information and presentation on the site
  - New features
  - The hydrological model

Nitrogen conc. Relative error 2010 2012





#### Conclusions

- Transparency highly appreciated by the users
- User positive to give feedback
- Users involvement very important for the development of the site
- Agile thinking supports quality of web site and model development
- During 2013: Interactive scenario tool for water quality



#### **Questions?**

#### Hydrology research team



#### **Project owners**

Niclas Hjerdt Lena Brahm Ericsson

IT-team Per Lewau Jens Gustafsson Tomas Pettersson