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Vattenwebb:

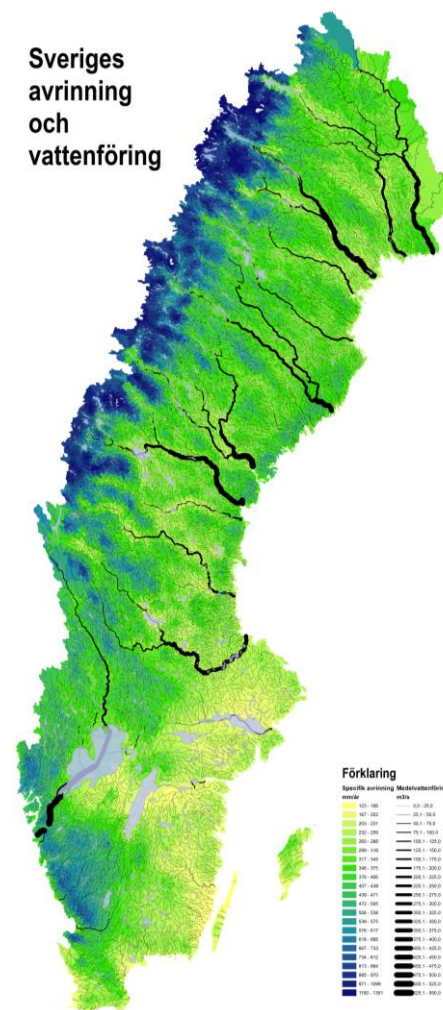
A transparent service to support decision makers in achieving improved water status.



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

Sveriges
avrinning
och
vattenföring



SMHI

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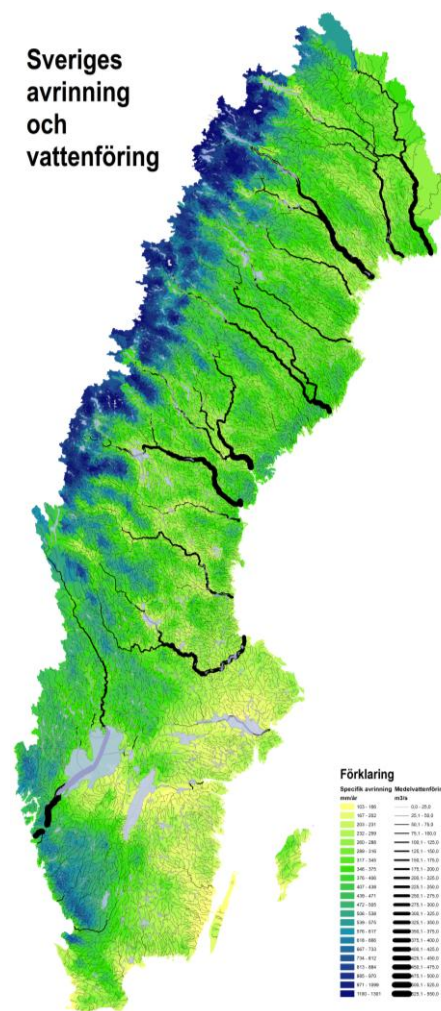
Ladda ner modellresultat per område	Ladda ner modellresultat hela Sverige	Ladda ner Mätningar
Utvärdera modellresultat för sötvatten	Utvärdera modellresultat för saltvatten	
Anlagda Vätmarker 2006	Anlagda Vätmarker 2012	Klimatscenarioer S-HYPE

Outline

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

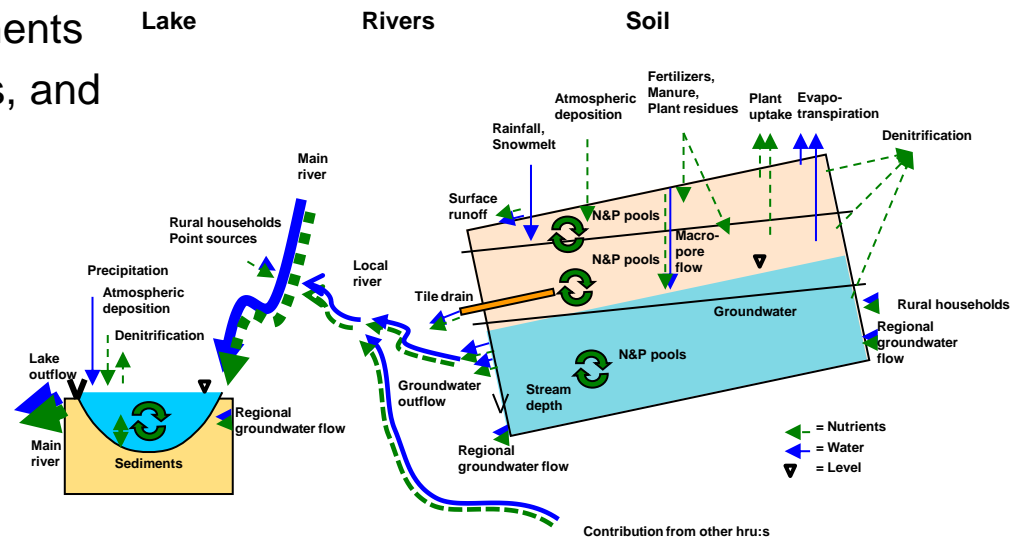
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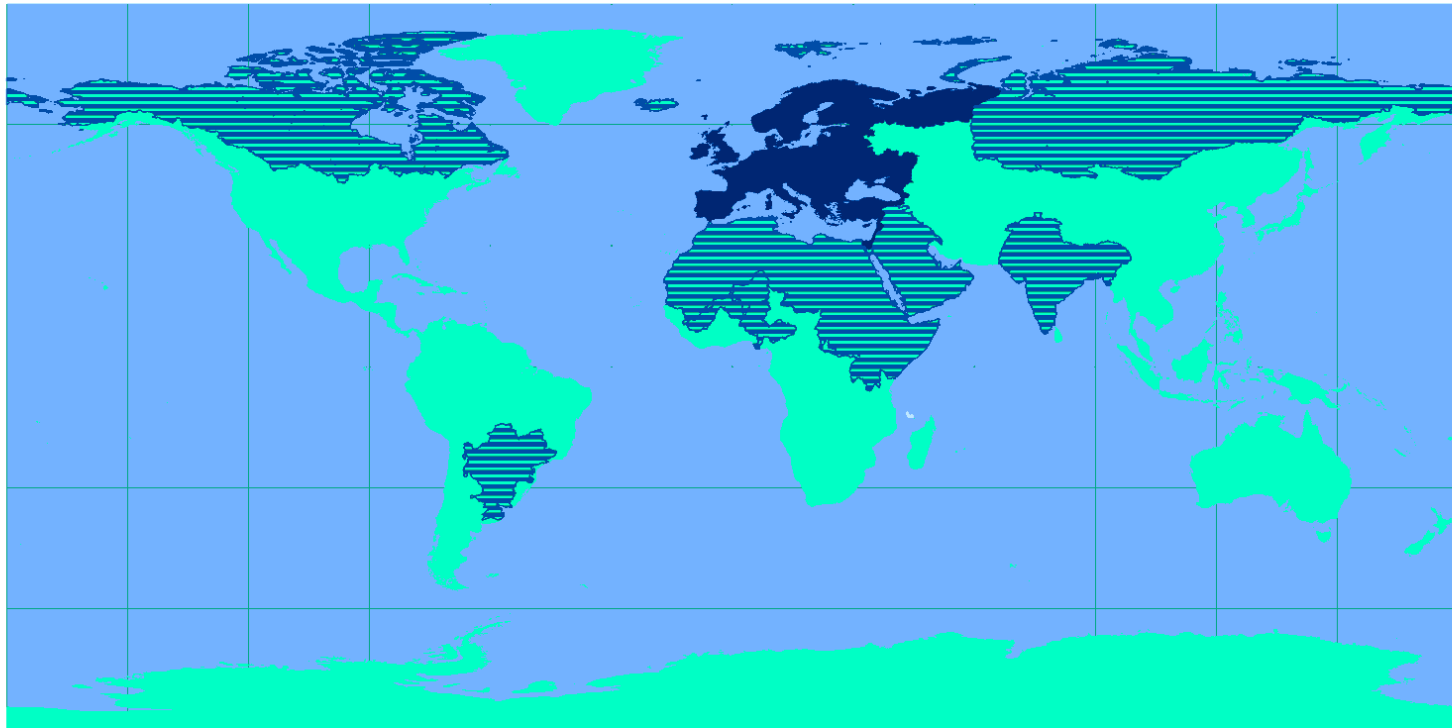


Hydrological Predictions for the Environment (HYPE)

- 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



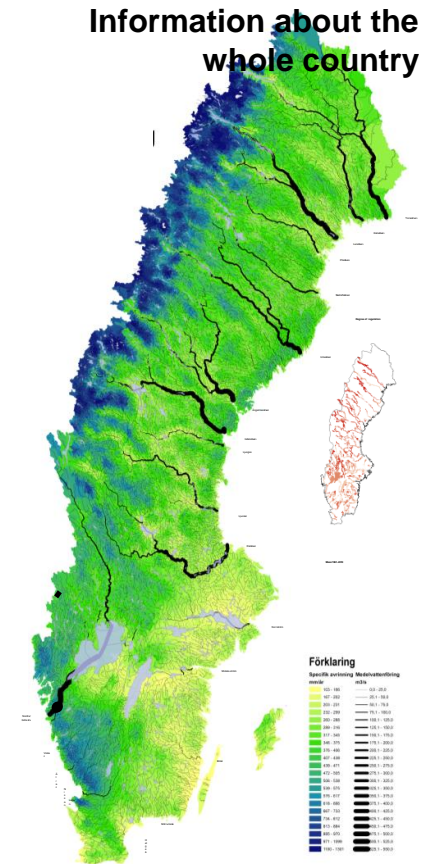
Dark blue = Operational HYPE model (daily forecasts)

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 km² 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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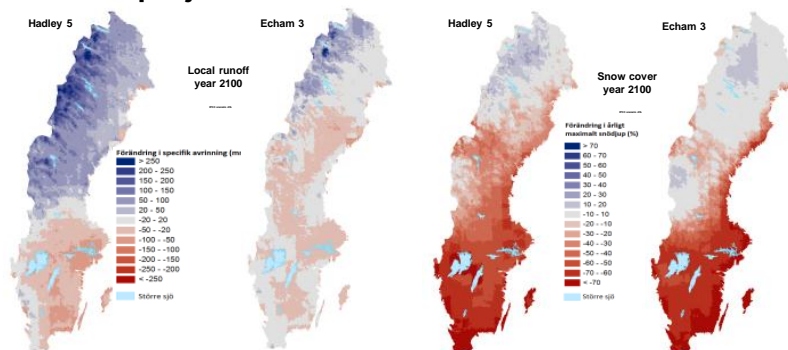


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Anlagda Våtmarker 2006	Anlagda Våtmarker 2012	Klimatscenerier S-HYPE

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

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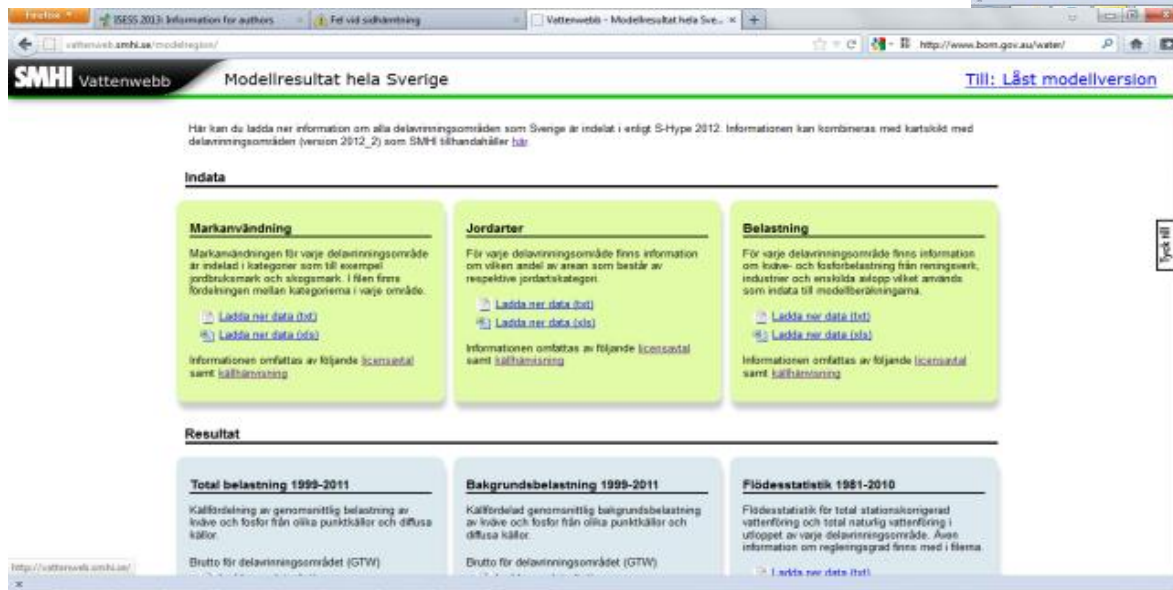
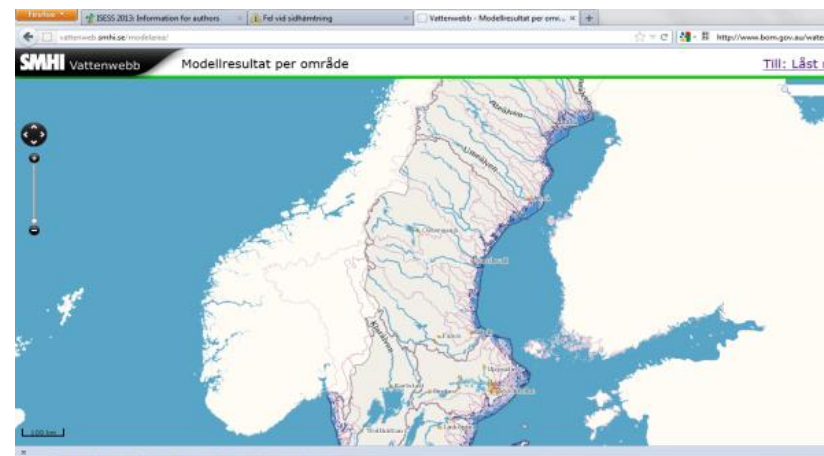
Design principles

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

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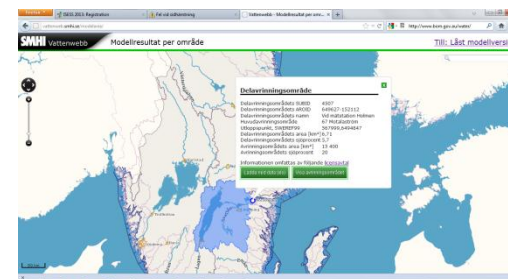
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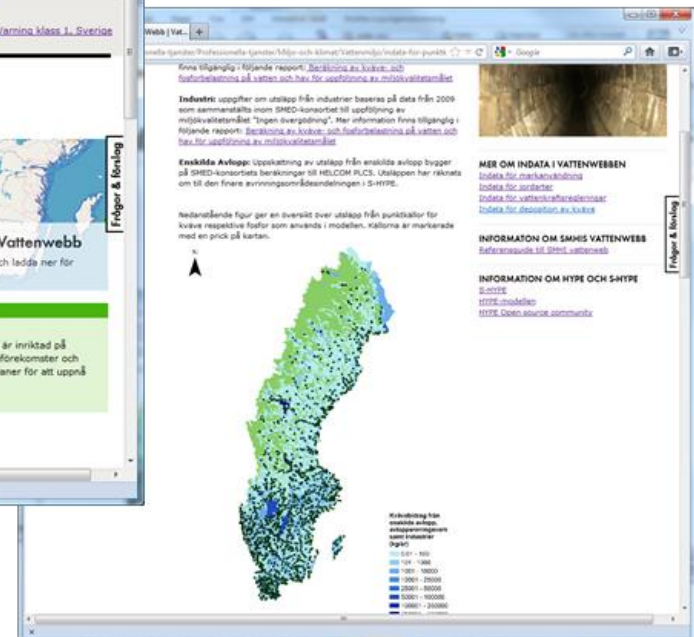
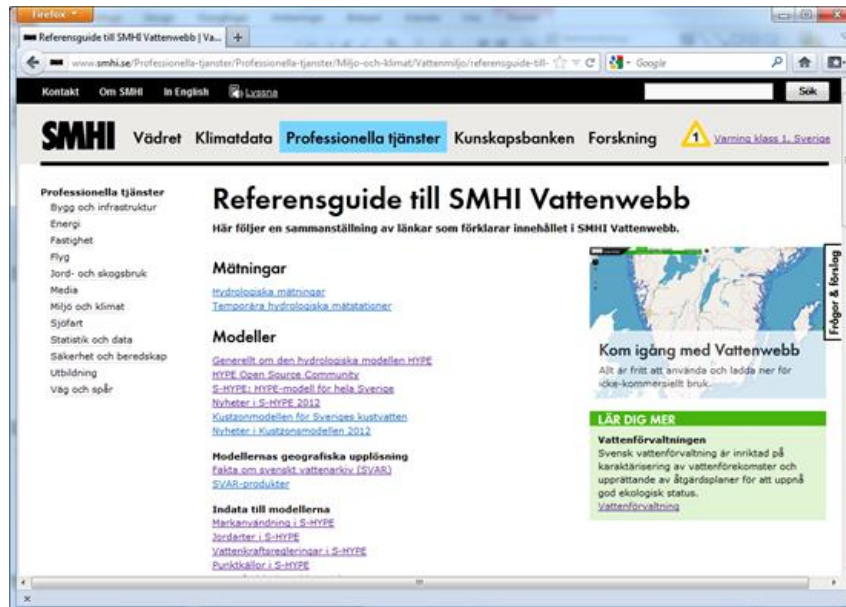


4507 [Skrivskyddad] [Kompatibilitetsläge] - Microsoft Excel

Modellinformation						
HYPE Modelsetup version:	S-HYPE2012_version_1_1_0					
HYPE version:	HYPE_version_4_3_0					
Simulation start time:	1978-01-01					
SVAR version:	SVAR_2012_2					
Delavrinningsområdet						
		Markanvändning		Jordarter		Belastning
Delavrinningsområdets SUBID:	4507	Glaciär	0,00%	Torv	0,00%	Enskilda
Delavrinningsområdets AROID:	649627-152112	Jordbruksmark	9,15%	Finjord/lera	1,66%	Avloppsvatten
Delavrinningsområdets namn:	Vid mätstation Holmen	Kalljäll och tunna jordar	0,00%	Grovjord	0,45%	Industri
Huvudavrinningsområde:	67_Motalaström	Karr	0,00%	Moran	69,38%	
Utloppspunkt, RT90:	567999_6494847	Mosse	0,00%	Tunn jord och kalt berg	17,11%	
Area [km ²]:	6,71	Sjö	5,70%	Sjö	5,70%	
Regleringsamplitud [m]:	0,00	Skogsmark	0,59%	Silt	5,69%	
		Urbant	84,55%			
		Övrig mark	0,00%			
Hela avrinningsområdet						
		Markanvändning		Jordarter		Belastning
		Glaciär	0,00%	Torv	0,00%	Enskilda

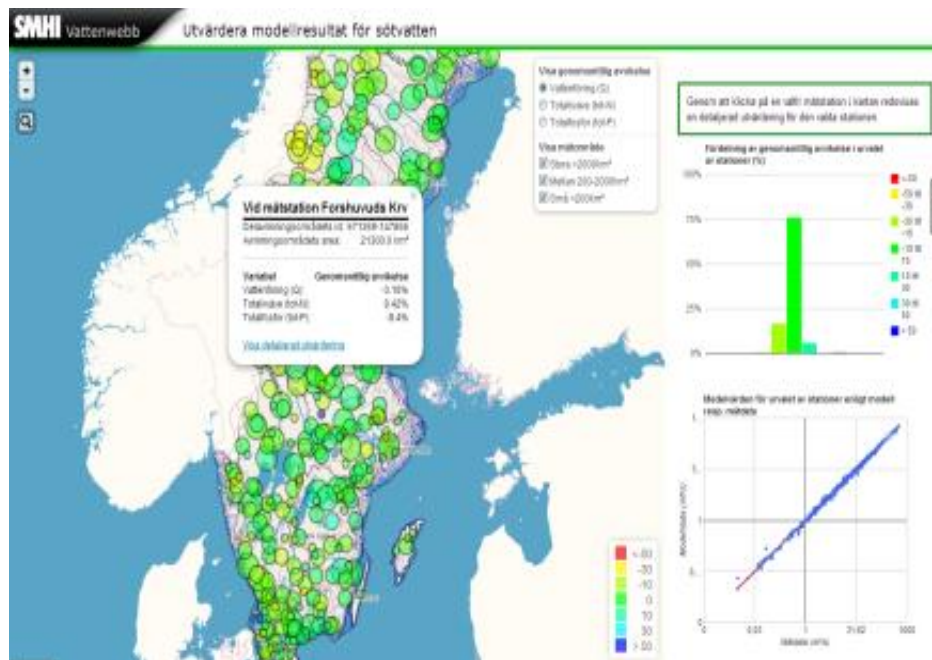
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- **Transparency of the model**
- Agile Development

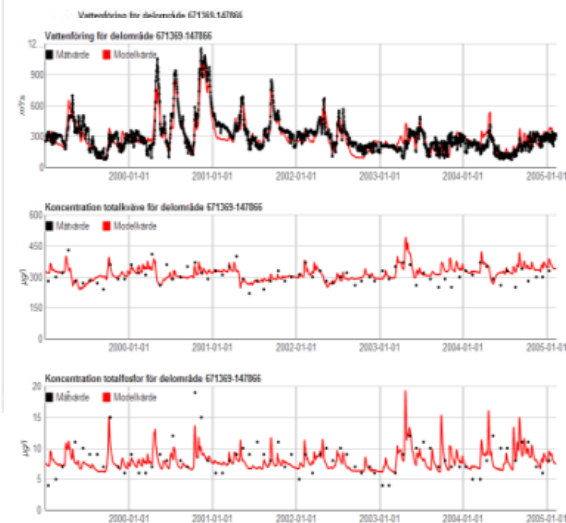


Vid mätstation Forshuvuds Krv

Delningsområdes-ID: 671369-147866
 Avseendets area: 21300,3 km²

Variabel	Medelvärde mätdata	Medelvärde modell	Genomsnittlig avvikelse
Vattenföring (Q)	304,82 m ³ /s	294,44 m ³ /s	-3,15%
Totalt löst (tot-N)	310,45 µg/l	329,7 µg/l	9,42%
Totalt fast (tot-P)	9,31 µg/l	8,52 µg/l	-8,4%

I tabellen har medelvärden för koncentrationer totalt löst respektive totalt fast bestämts genom att förskatta enskilda värden. Se [information.se/medelvaerdesammanfattning/](http://information.smhi.se/medelvaerdesammanfattning/) i diagrammen nedan visar tillväxer från både modell och mätdata för variablerna vattenföring, totalt löst och totalt fast. Du kan själv bestämma vilken tidsperiod som ska visas i diagrammen genom att använda scrollfunktioner längst ner.

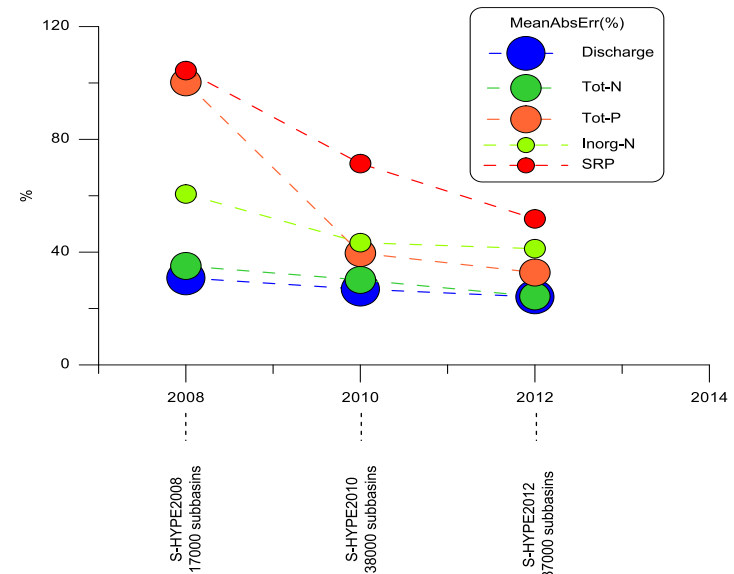


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- **Agile Development**

Agile model development

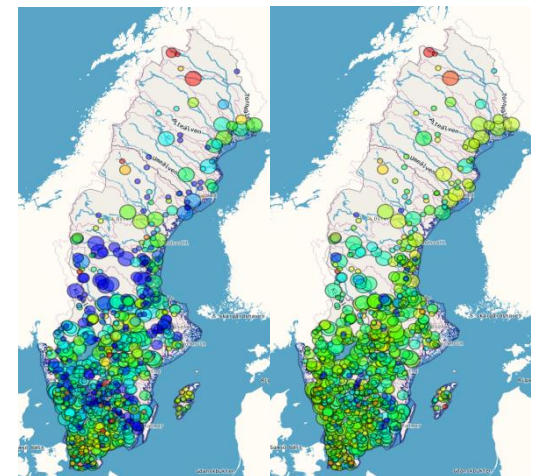
- Start with the large picture, fill in the details
- Gradually improve the model, but make the best possible estimation at each point.
- Water and water quality support each other to improve the model.
- Continuous improvement - the next model version will always be the best.



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

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