

enjubu

Nytt datasett  
Hjelp

Modellkjøringer

Svorka

Fansi  
 Prodrisk  
 Vansimtap

Sortering fungerer ikke i Internet Explorer, bruk Google Chrome.

Grafalternativer

Vis historikk  
 Vis årspunkter  
 Vis Bånd  
 Relativ tabell

Velg grafer

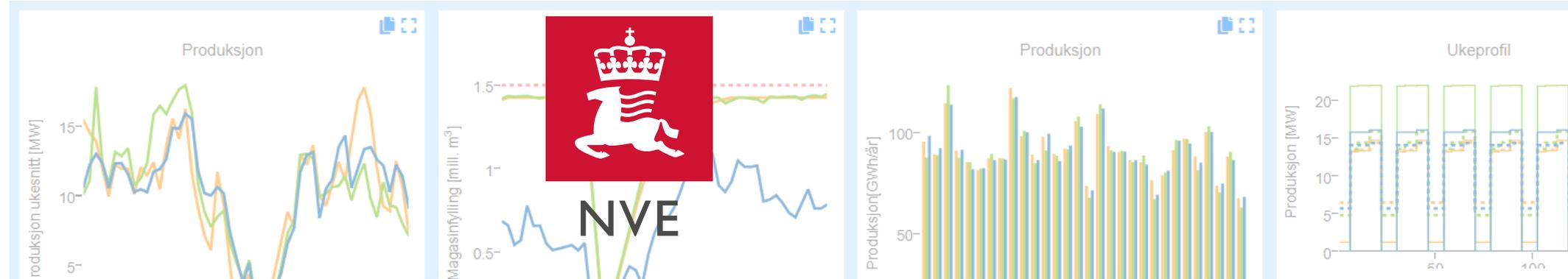
Produksjon  
 Mag (modul)  
 Årsproduksjon  
 Ukeprofil

Legg til modell

Slipp ny modell her

eller sti på e-srv0:

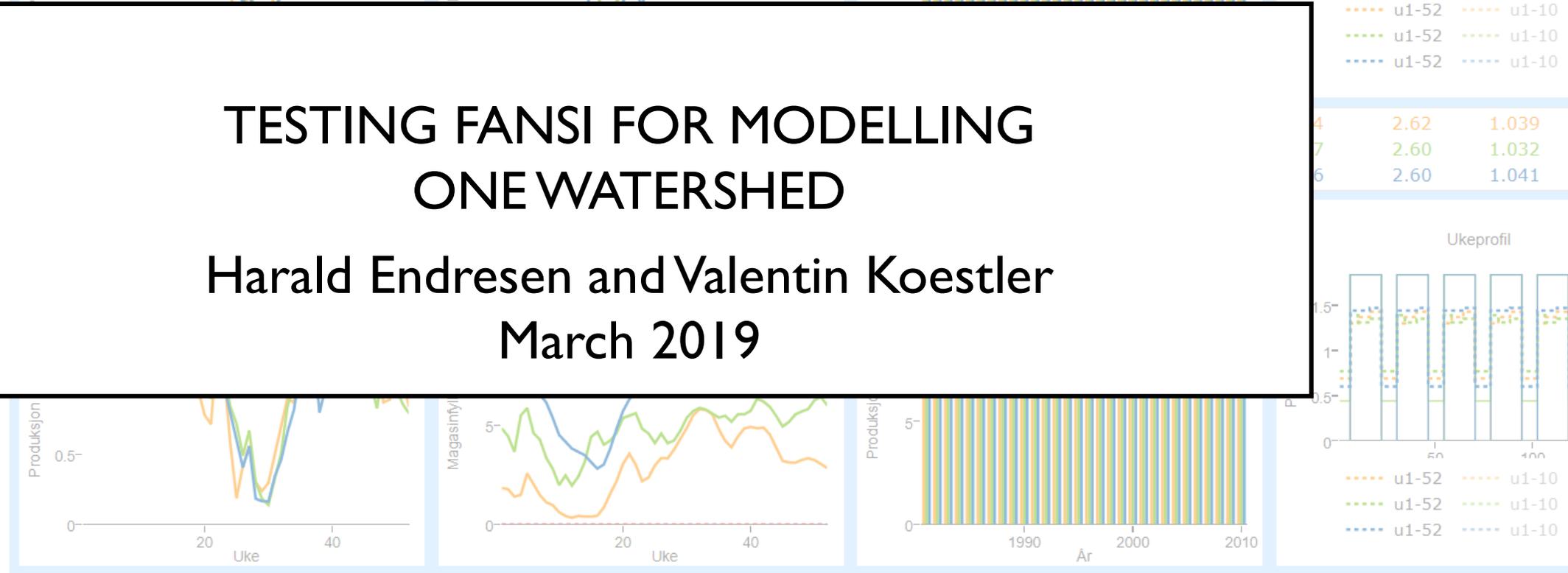
Omr	Modul	Modulnavn	Ytelse [MW]	MagLok [Mm <sup>3</sup> ]	MagTot [Mm <sup>3</sup> ]	Tilsig [Mm <sup>3</sup> ]	Forb. [Mm <sup>3</sup> ]	Flom [Mm <sup>3</sup> ]	Vanntap [Mm <sup>3</sup> ]	Qt [Mm <sup>3</sup> ]	Prod. [GWh]	Inntekt [MNOK]	Verdi. faktor
1.	45801	SVORKA	22	1.50 b	38.70	156.80	0.12		0.12	155.60	90.70	25.46	1.042
			22	1.50 b	38.70	156.84	0.64		0.64	154.20	89.87	25.23	1.043
			22	1.50 b	38.70	156.80		2.26	2.26	155.14	90.16	25.22	1.037



**TESTING FANSI FOR MODELLING ONE WATERSHED**

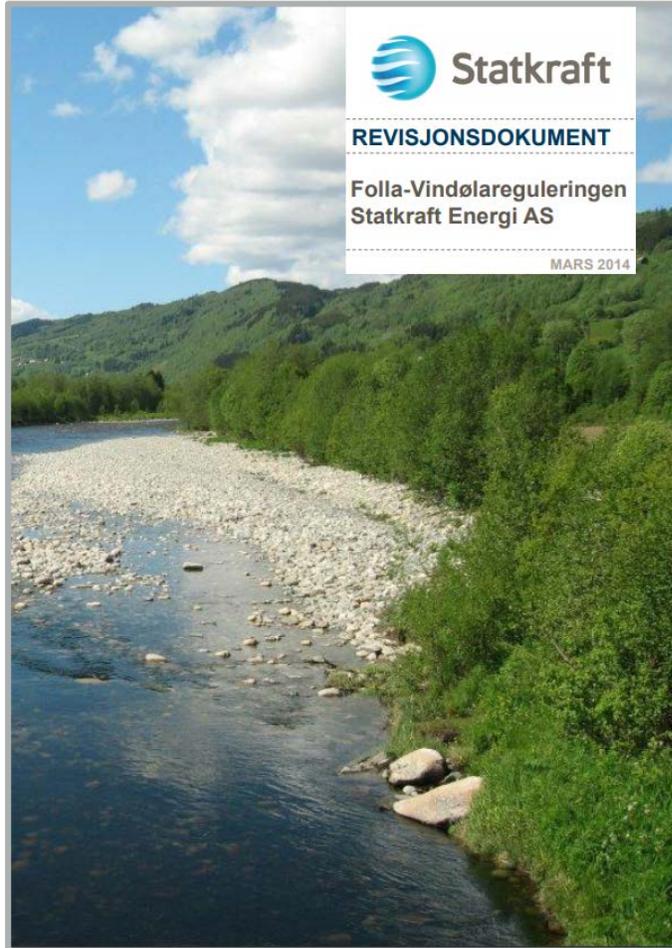
Harald Endresen and Valentin Koestler

March 2019

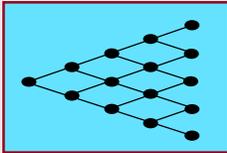
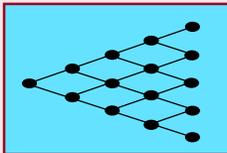
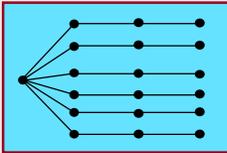


1.	45803	ANDERSVATN	11.00 r	11	28.57	28.62
			11.00 r	11	28.58	28.62

# What does NVE need from hydropower modelling?



# Comparison of Vansimtap, Prodrisk and Fansi

Attribute \ Model	Vansimtap	ProdRisk	Fansi
Inflow resolution	Weekly	Daily	Weekly
Head effect in strategy	No	Yes	Yes
<b>Individual water values</b>	Single reservoir	Yes	Yes
Solution method	SDP	SDDP	SFS
Time use	Fast	Slow	Slow
<b>Uncertainty representation</b>			



# Test set-up

- II watersheds
- Default parameters
- Qualitative comparison of results

```
from nve_modell.prosjekt.prt import RunTest

conf = dict()
conf["omrnavn"] = "BARDU"
conf["path_output"] = "test_bardu_2"
conf["path_detd_fil"] = "input/MALSELV_H.DETD"

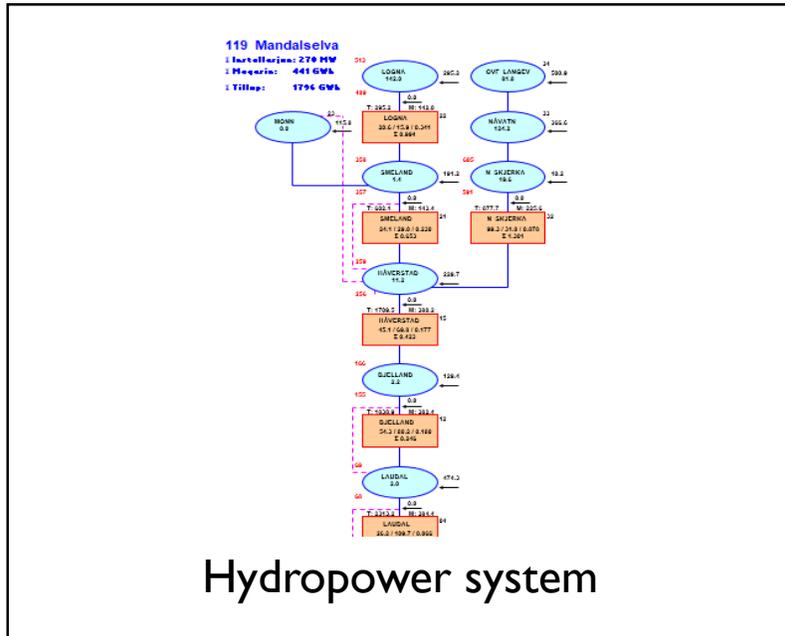
conf["scenarioer"] = [
    {
        "navn" : "vansimtap",
        "modell" : "vansimtap",
    },
    {
        "navn" : "prodrisk",
        "modell" : "prodrisk",
    },
    {
        "navn" : "fansi",
        "modell" : "fansi",
    },
]
```

New Volume (D:) ▶ Prosjekter ▶ 2018\_Prodrisk ▶ Testsystem ▶ test\_bardu\_2

Name	Date modified	Type
fansi	11.07.2018 11:08	File folder
prodrisk	11.07.2018 11:05	File folder
vansimtap	11.07.2018 10:57	File folder
RunTest.pkl	11.07.2018 11:08	PKL File
tid.txt	11.07.2018 11:08	Text Document

# Using Fansi for one watershed

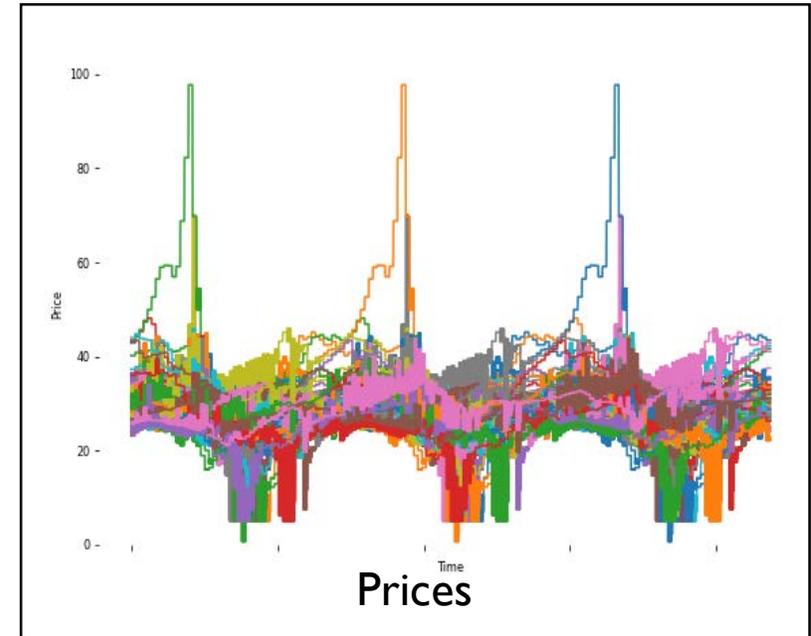
## Area 1



← 99999 MW →

Unlimited capacity

## Area 2

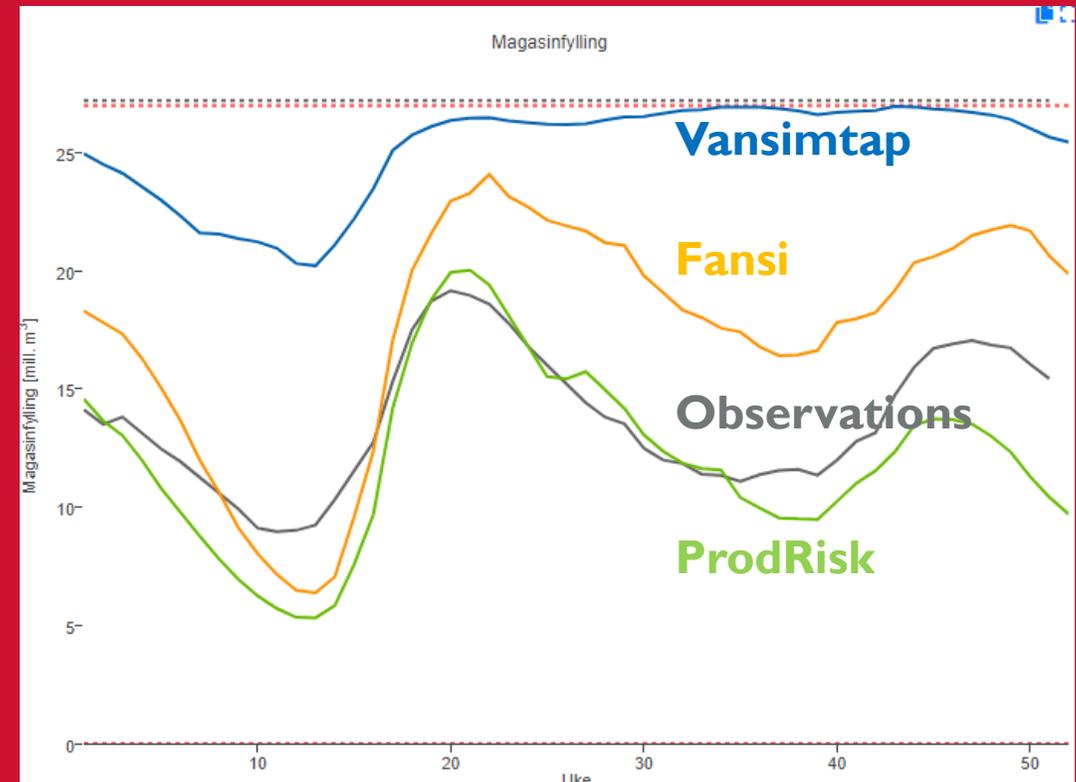




## ProdRisk & Fansi give higher revenue

- ProdRisk and Fansi are closer to observed reservoir filling
- The three models are more similar in simple watersheds (Bardu, Røssåga etc.)
- Vansimtap still gives quite good results, especially for the watershed as a whole

<b>GLB</b>	<b>Prod. [GWh]</b>	<b>Inntekt [MNOK]</b>	
	<b>11,705.54</b>	<b>3,134.13</b>	<b>Vansimtap</b>
	<b>12,278.06</b>	<b>3,341.92</b>	<b>FanSi</b>
	<b>12,212.46</b>	<b>3,306.84</b>	<b>Prodrisk</b>



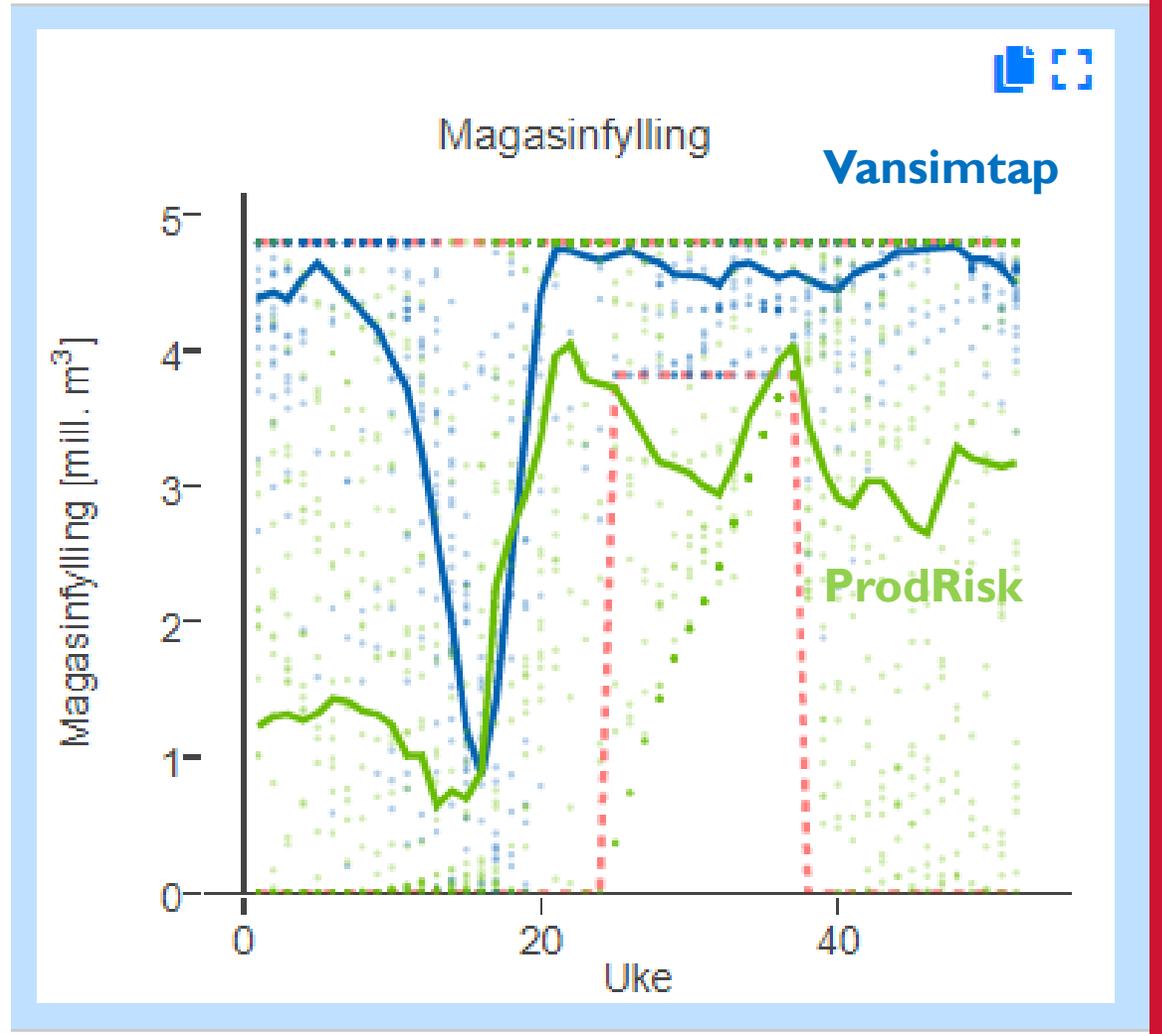
Reservoir filling of Flittig kraftverk in the Skien watershed. Average 1981-2010, observations 1998-2017

# Vansimtap is better at "soft" constraints for reservoirs

- Vansimtap:  
Rule-based constraints
- Prodrisk & Fansi:  
All constraints are the same, adjusts cost for violating constraints.

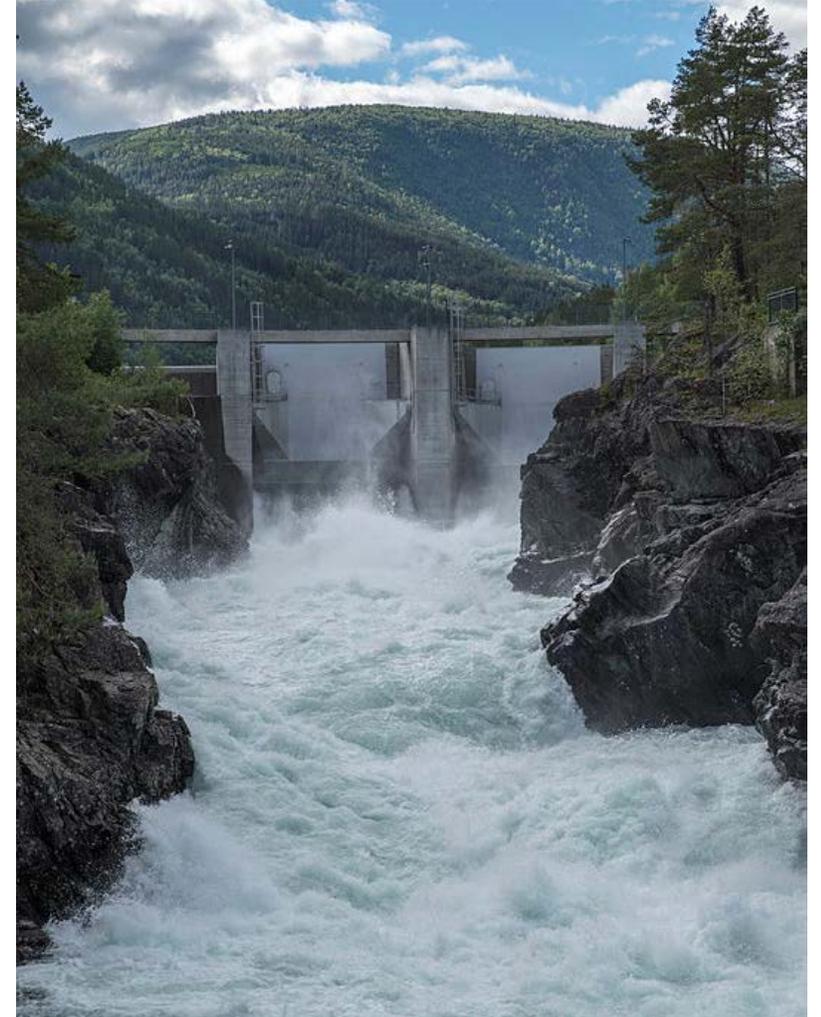
"After June 1<sup>st</sup>, all inflow should go towards filling the reservoir until it reaches level 474"

1 512 TYRIA 2 2.  
2.



## Fansi was faster than Prodrisk in this test

- Run-times for Glomma and Lågen watershed:
  - Vansimtap: 20 seconds
  - Fansi: 60 minutes
  - ProdRisk: 12 hours
- Simulation parameters and hardware will affect time use a lot.
- Time use affects how you work with the models in practice.



Dam Eidefoss, Stig Storheil NVE

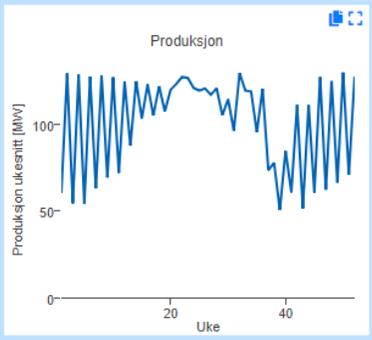
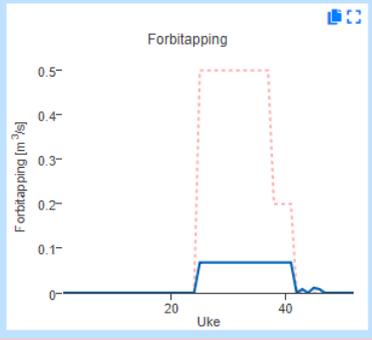
# Only ProdRisk uses daily inflow

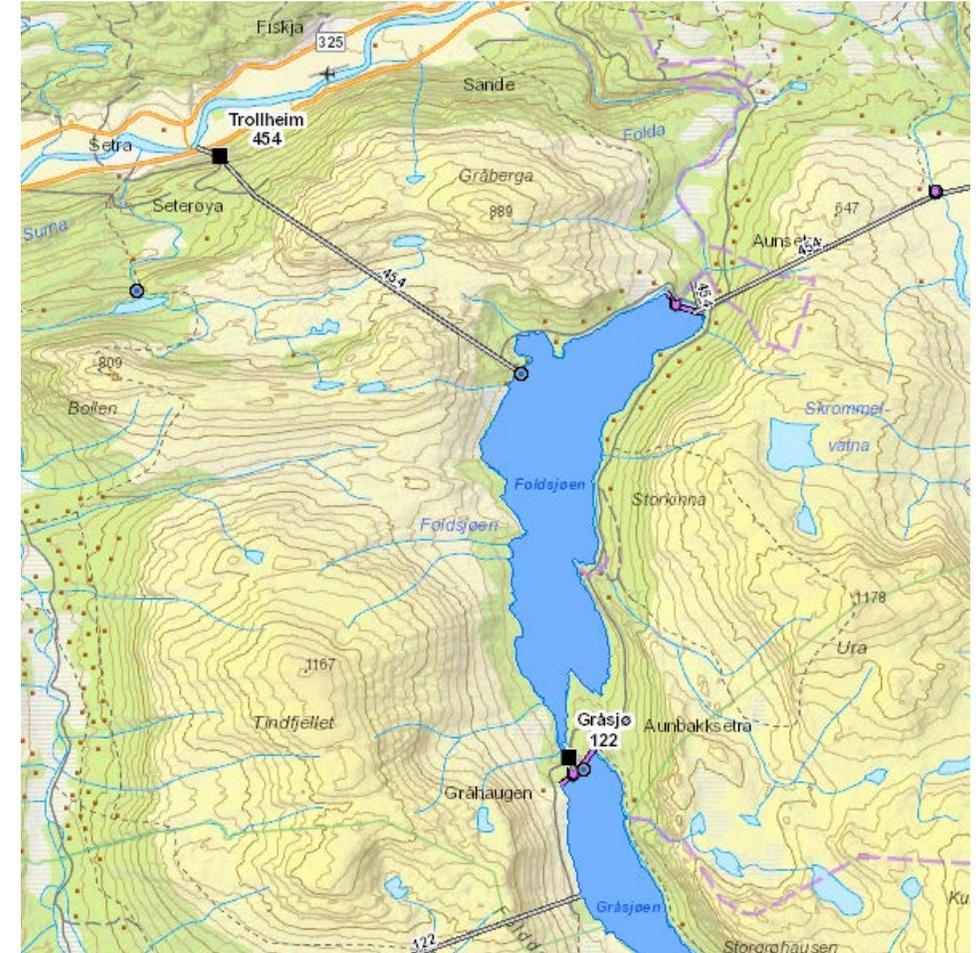
- Daily inflow resolution as opposed to weekly inflow is not important if the reservoirs are large.
- In watersheds with small reservoirs daily inflow resolution matters.



Omr	Modul	Modulnavn	Ytelse [MW]	MagLok [Mm <sup>3</sup> ]	Vanntap [Mm <sup>3</sup> ]	
1	45902	Grytdalen	1.20	10.90 r	1.27	FanSi
			1.20	10.90 r	5.25	ProdRisk
			1.20	10.90 r	1.64	Vansimtap

# Fansi still has some possible bugs

Incident	#	
Crash	1	Bergsdalselva
Oscillating production	1	
Constraint violation	9	



We want to continue to explore the use of Fansi

- Fansi works quite well for modelling one watershed.
- Fansi can also model larger power systems and grid

