

# Utfordringer med klimaframskrivning og klimavirkningsstudie

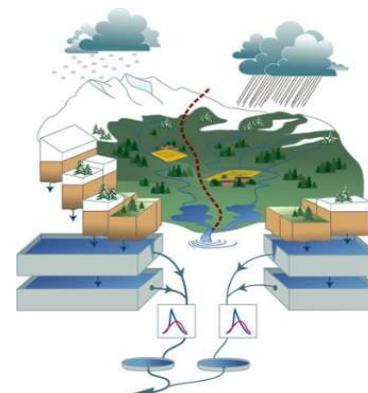
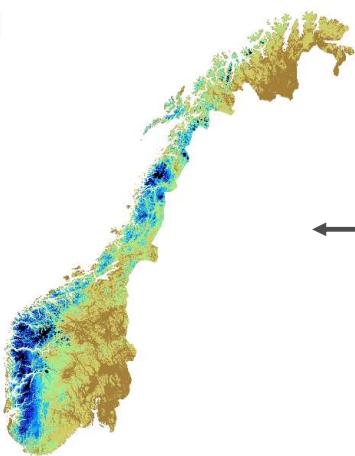
Wai Kwok Wong

Forsker, NVE

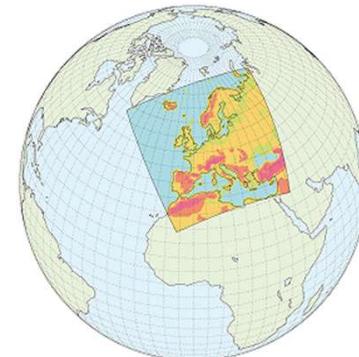
2.11.2022 Webinar «Vannkraft og klima»



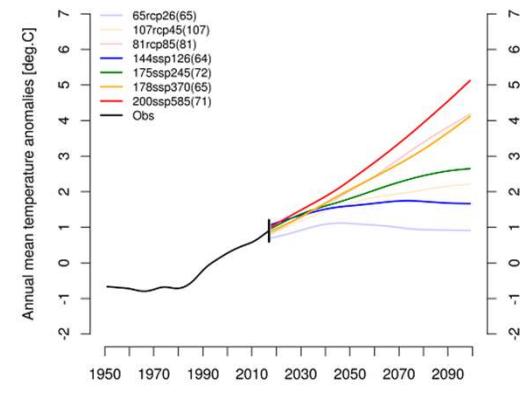
# Klima- og hydrologisk modellering



Kilde: SMHI

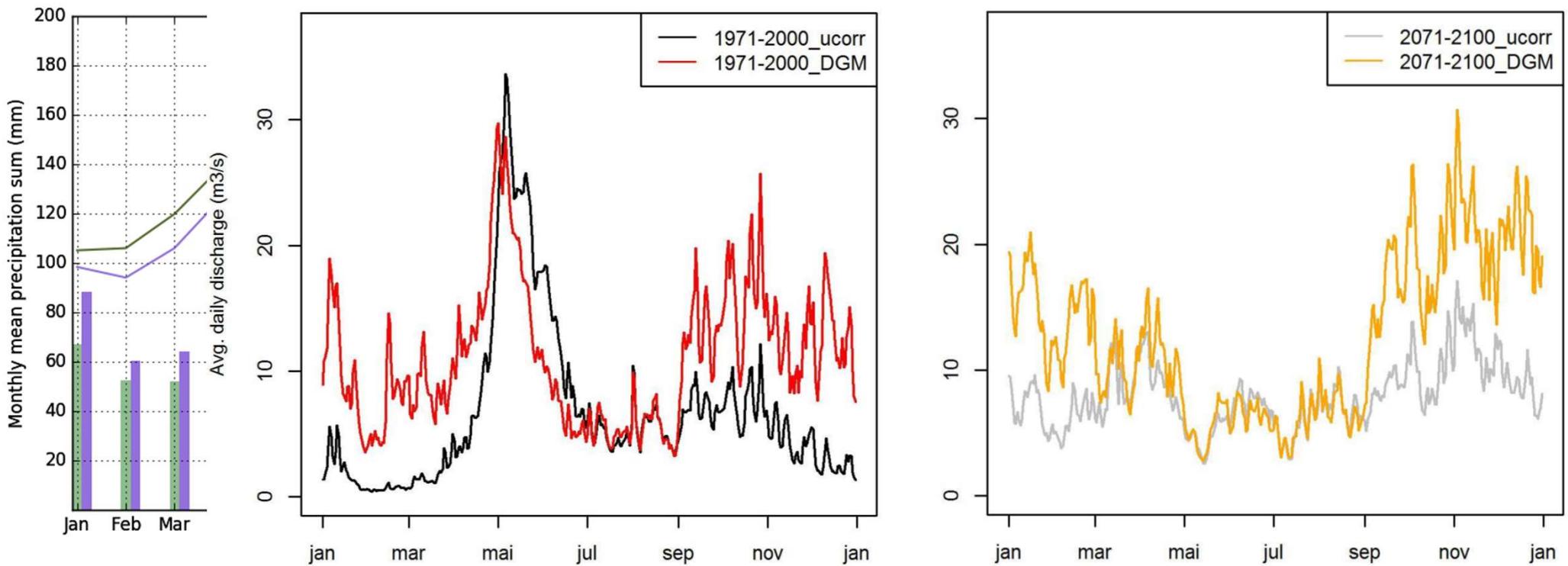


Kilde: SMHI



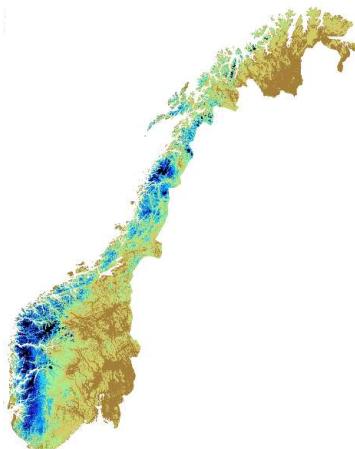
Kilde: Abdelkader Mezghani, MET

# Systematisk avvik (bias)



Kilde: Deborah Lawrence, NVE

# Biasjustering



Romlig  
oppløsning

1 x 1 km

Tids  
oppløsning

24t

Biasjusterings  
metoder

EQM + 3DBC

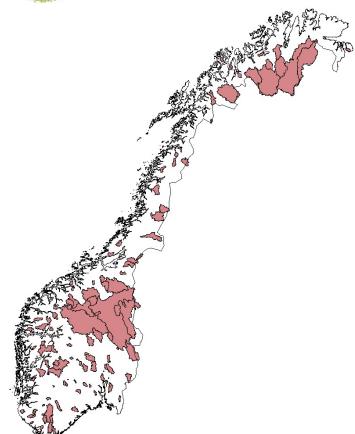
Inngangs  
variabler

9

Hydrologisk  
modell

DistHBV

10 klimamodeller x 3 scenarioer x 2 biasjusteringsmetoder = 60 datasett ~ 20 TB data



Nedbørfeltbasert

24t og 3t

EQM + DGM

P og T

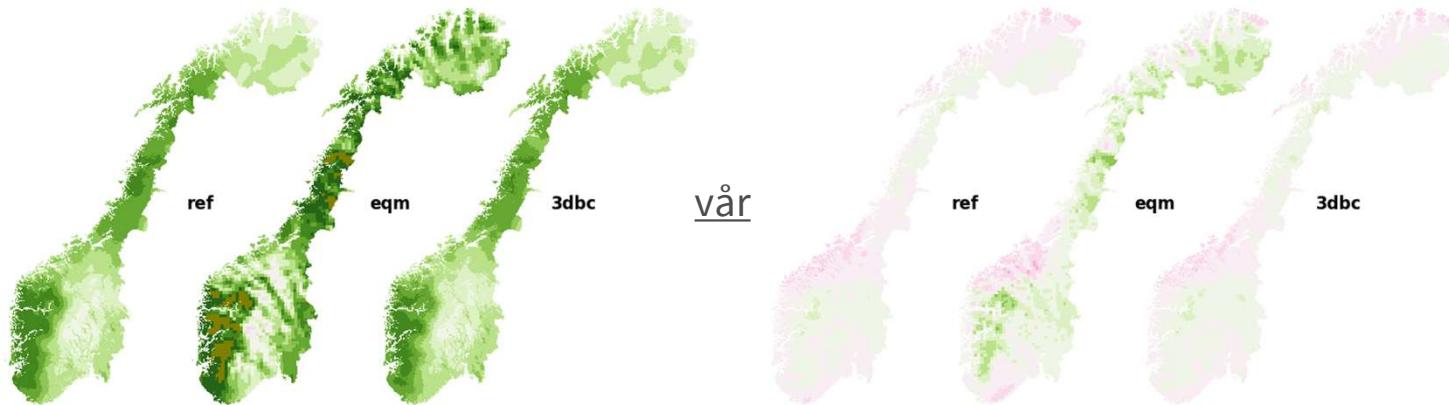
FeltHBV, DDD

# Evaluering av biasjusteringsmetoder

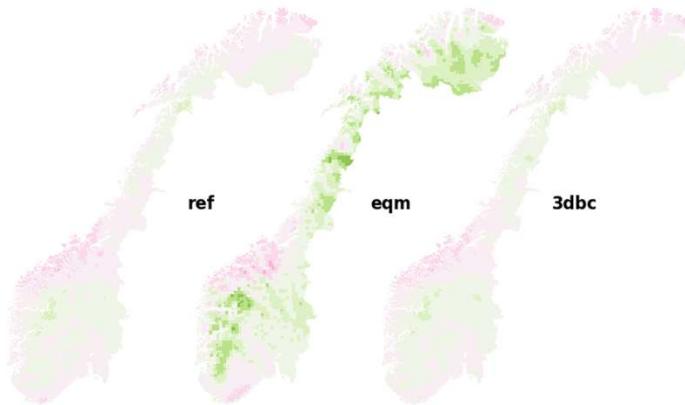
Nedbør-temperatur korrelasjonsmønster (1960-1984)

Unpublished materials

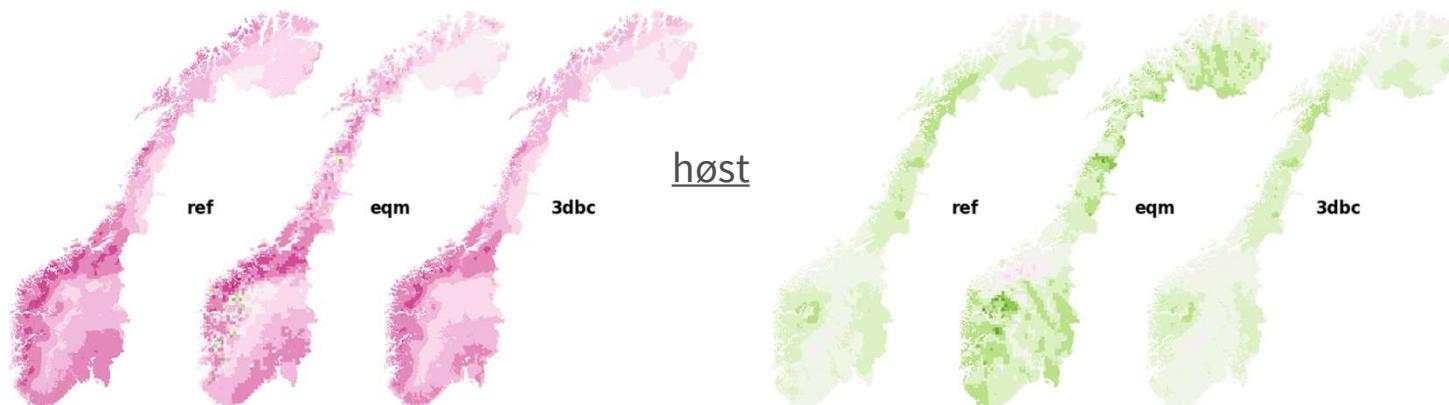
vinter



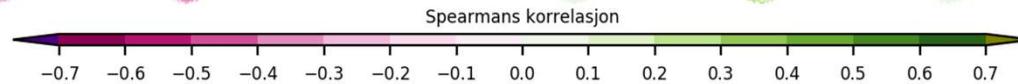
vår



sommer



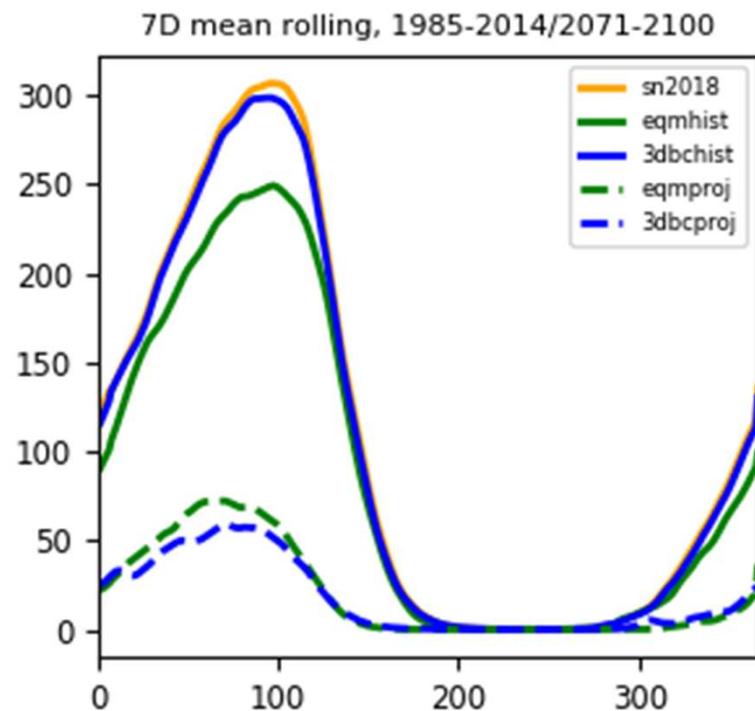
høst



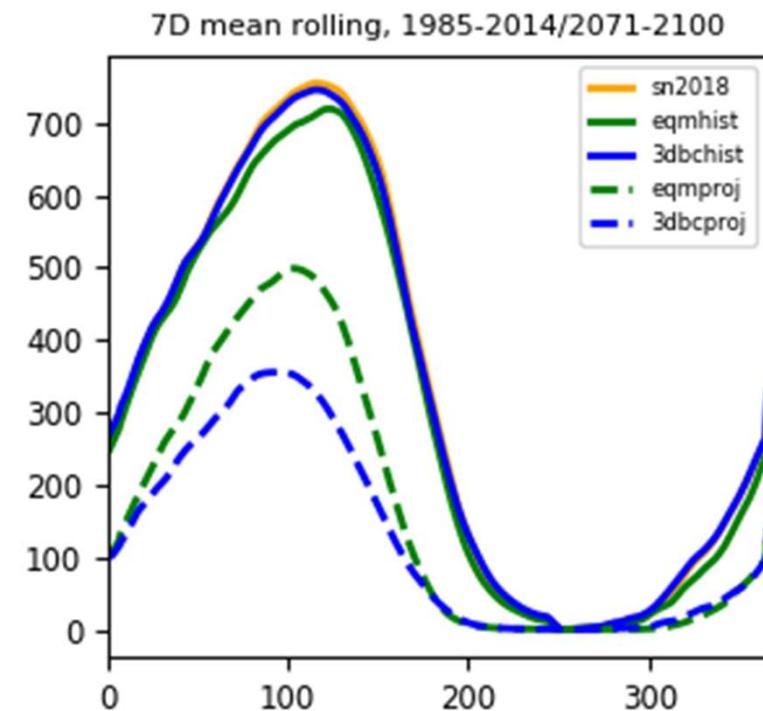
# Effekt av biasjusteringsmetoder - snø

Unpublished materials

Gaulfoss

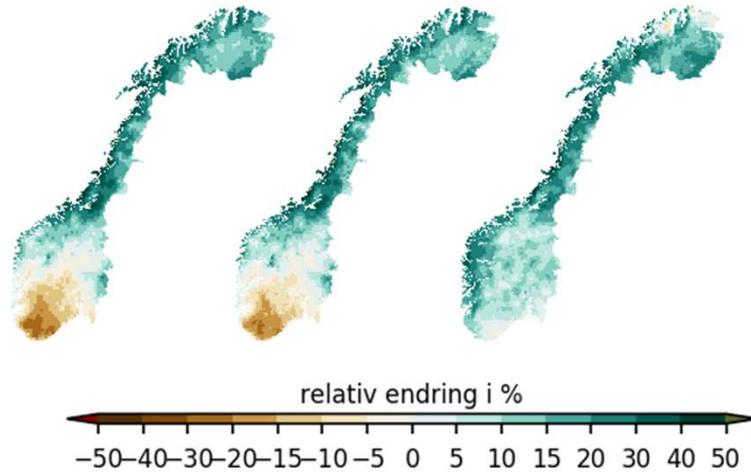


Hølen

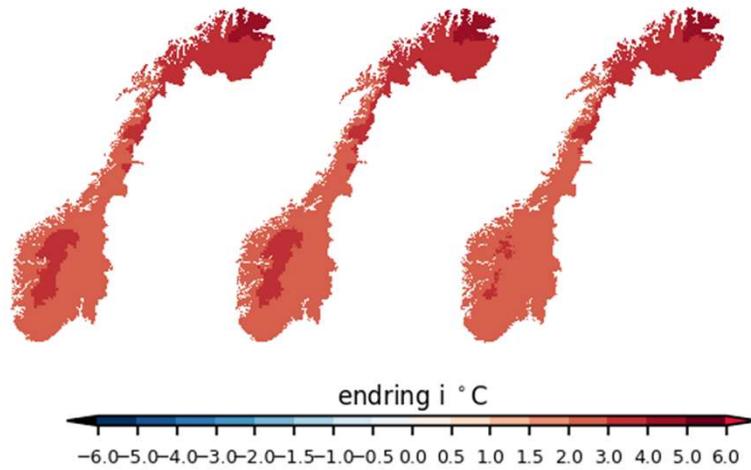


# Klimaendringssignaler, sommer (2071-2100 vs. 1985-2014)

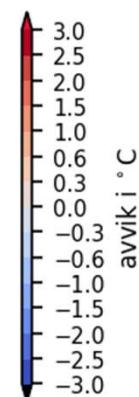
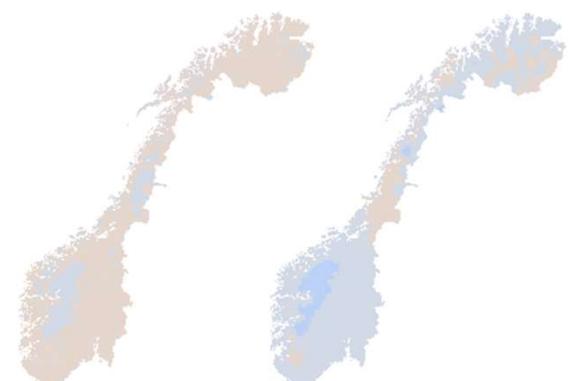
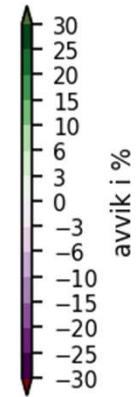
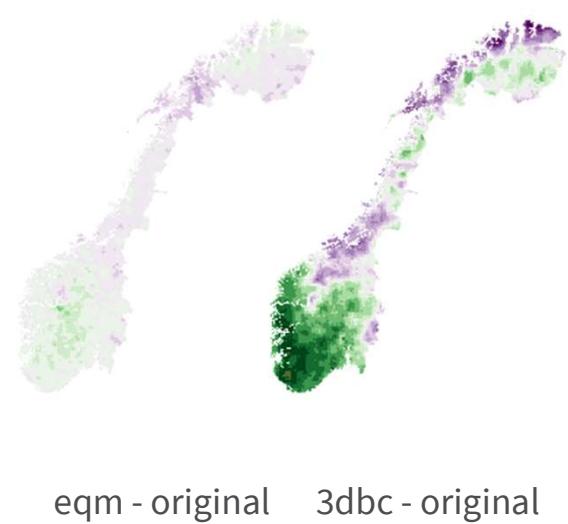
Nedbør



Temp

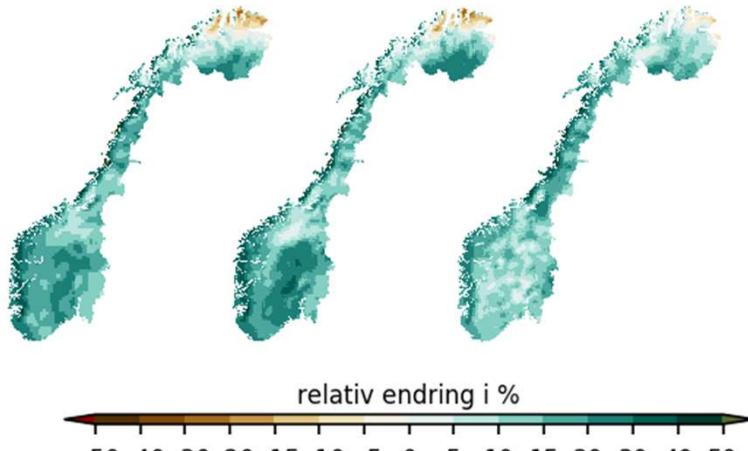


Unpublished materials



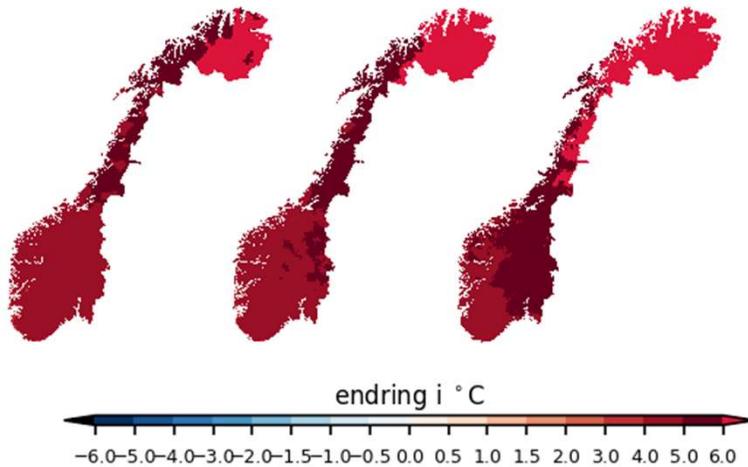
# Klimaendringssignaler, vinter (2071-2100 vs. 1985-2014)

Nedbør

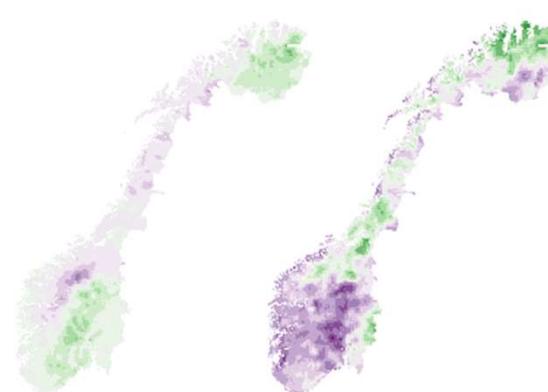


original      eqm      3dbc

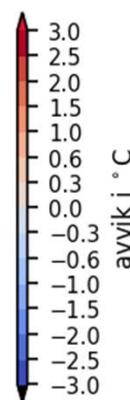
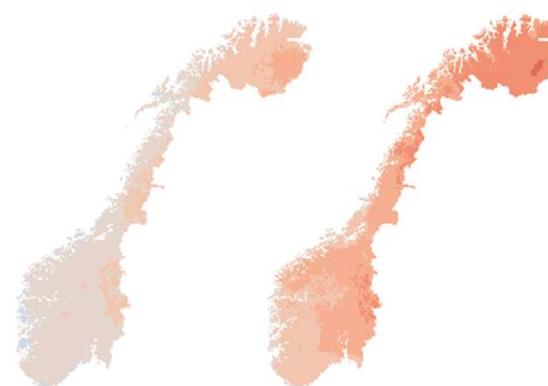
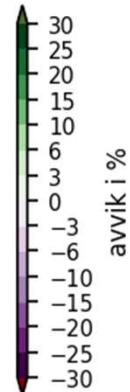
Temp



Unpublished materials



eqm - original      3dbc - original



| Method                                      | EQM | QDM | 3DBC                        |
|---|-----|-----|-----------------------------|
| Univariate correction                       | Yes | Yes | Yes                         |
| Modification of inter-variable correlations | No  | No  | Yes                         |
| Modification of spatial correlations        | No  | No  | Yes                         |
| Modification of temporal correlations       | No  | No  | Yes                         |
| Preserve model correlations structure       | Yes | Yes | No                          |
| Preserve changes in corr. structure         | Yes | Yes | Yes (lag 1 autocorrelation) |
| Preserve annual mean climate change         | Yes | Yes | Yes                         |
| Preserve seasonal mean climate change       | Yes | Yes | No                          |

Kilde: Andreas Dobler, MET

**François et al. 2020: Multivariate bias corrections of climate simulations: which benefits for which losses? doi: 10.5194/esd-11-537-2020**

# Oppsummering

- Biasjustering nødvendig
- ‘Riktig’ metode avhengig av bruken
- Oppmerksom på metodens begrensninger
- For klimavirkningsstudier => store sprik
- Ikke enkel modell, men heller et modellensemble