



# How well does Models Represent Relative Humidity in the Arctic?

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# Motivation

RH have many applications

E.g. Optical properties

Models and measurements are compared for same RH

If Model  
RH ok:

## Measurement:

RH	Optical property
40%	#1
60%	#2
80%	#3

## Model:

RH	Optical property
20%	#1
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# Motivation

RH have many applications

E.g. Optical properties

Models and measurements are compared for same RH

Thus, important to know how well RH is modelled

If Model  
RH ok:

If model  
RH not ok:

## Measurement:

RH	Optical property
40%	#1
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## Model:

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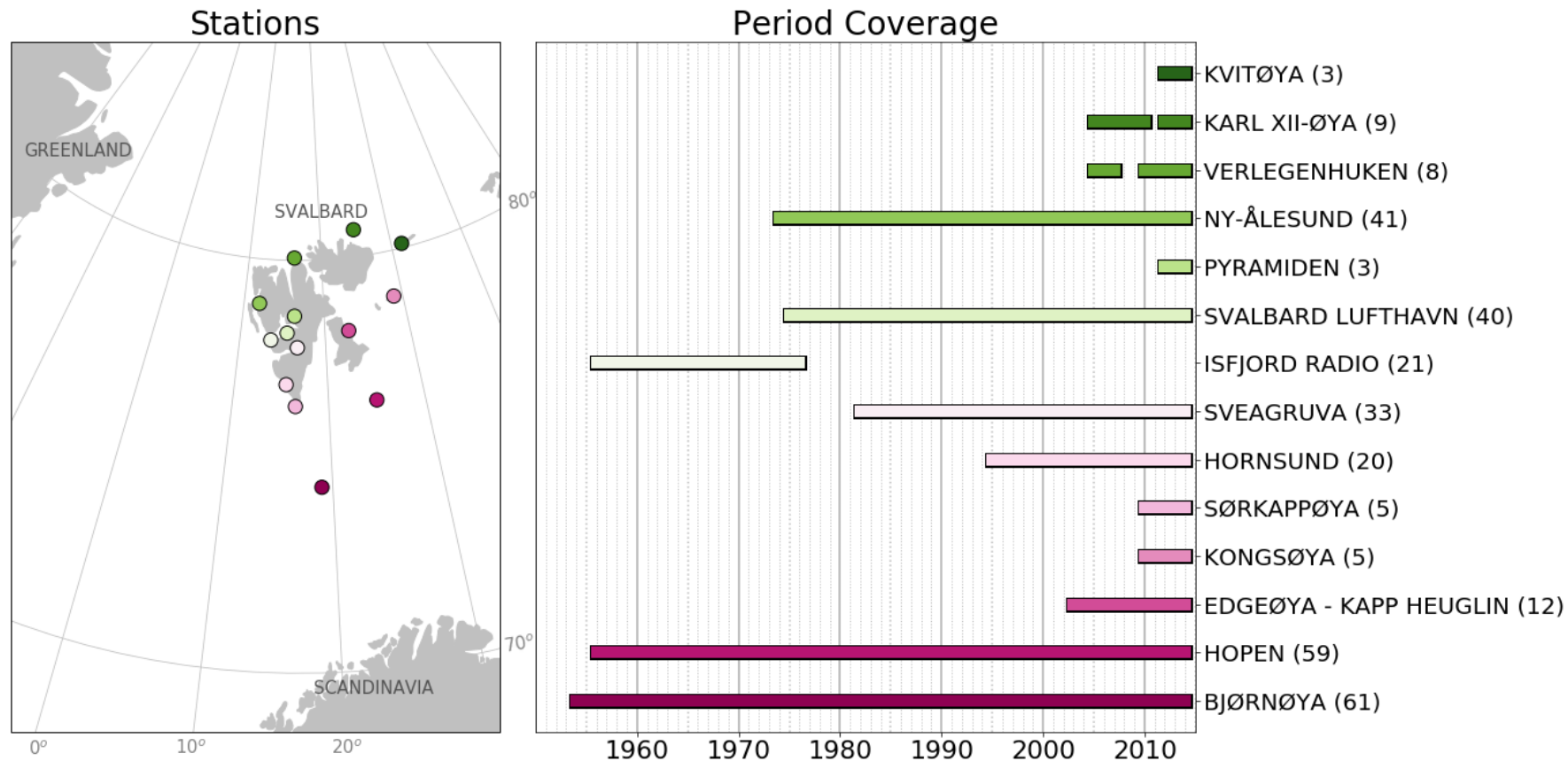
# Goal

Assess whether Models are able to represent (near surface) RH in the Arctic

When and where do the models perform better/worse? (e.g. month, location)

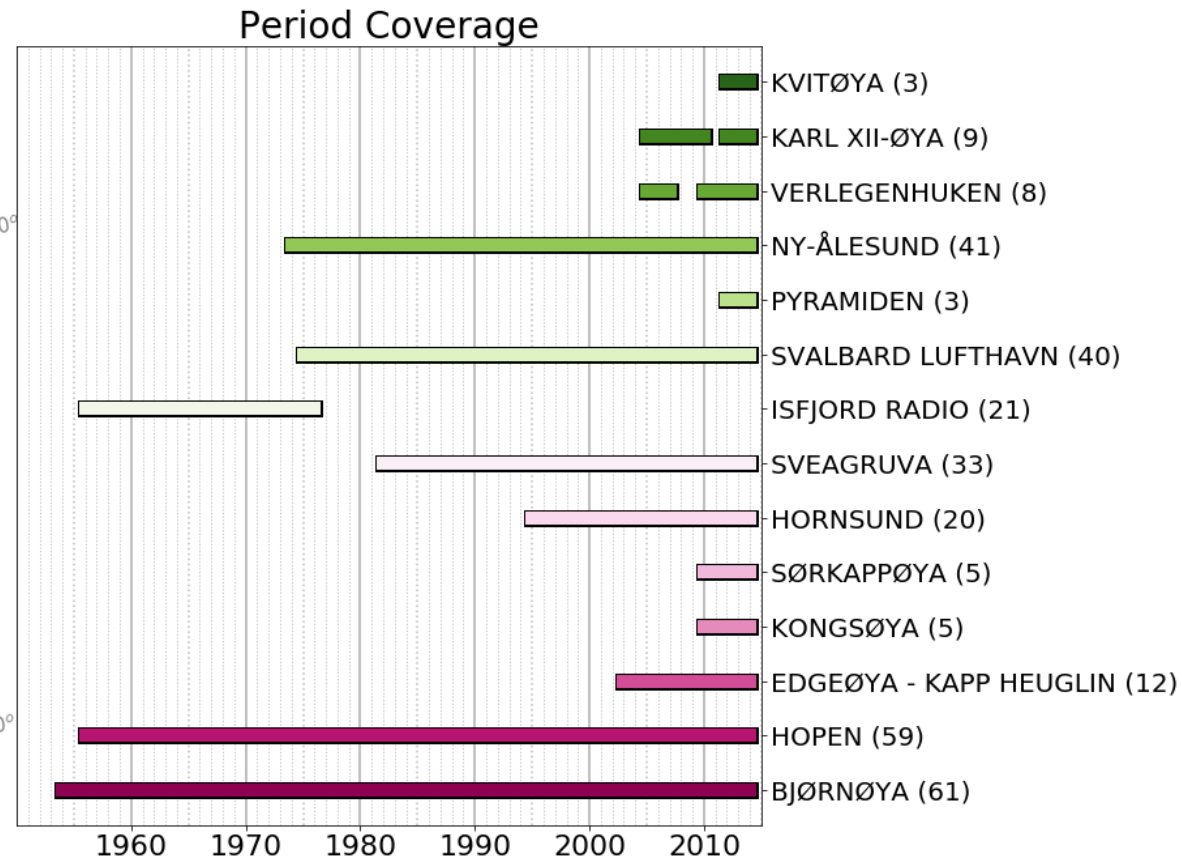
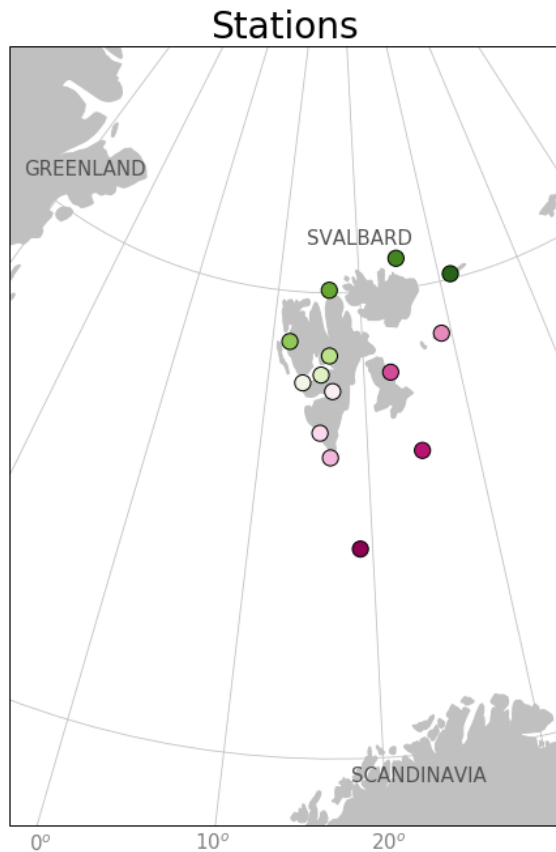
# Data

## Observations: 6-hourly



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**Models: mean monthly**  
IPSL-CM6A-LR,  
CanESM5,  
CESM2

10 historical CMIP6  
runs pr model

# Methods

- Mean monthly timeseries
  - Temporal (and spatial) collocation
- 



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Observations and  
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## #2: Median Maps

Map of March and Sep. median 2012-2014 for each model ensemble together with Observations

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Map of March and Sep. median 2012-2014 for each model ensemble together with Observations

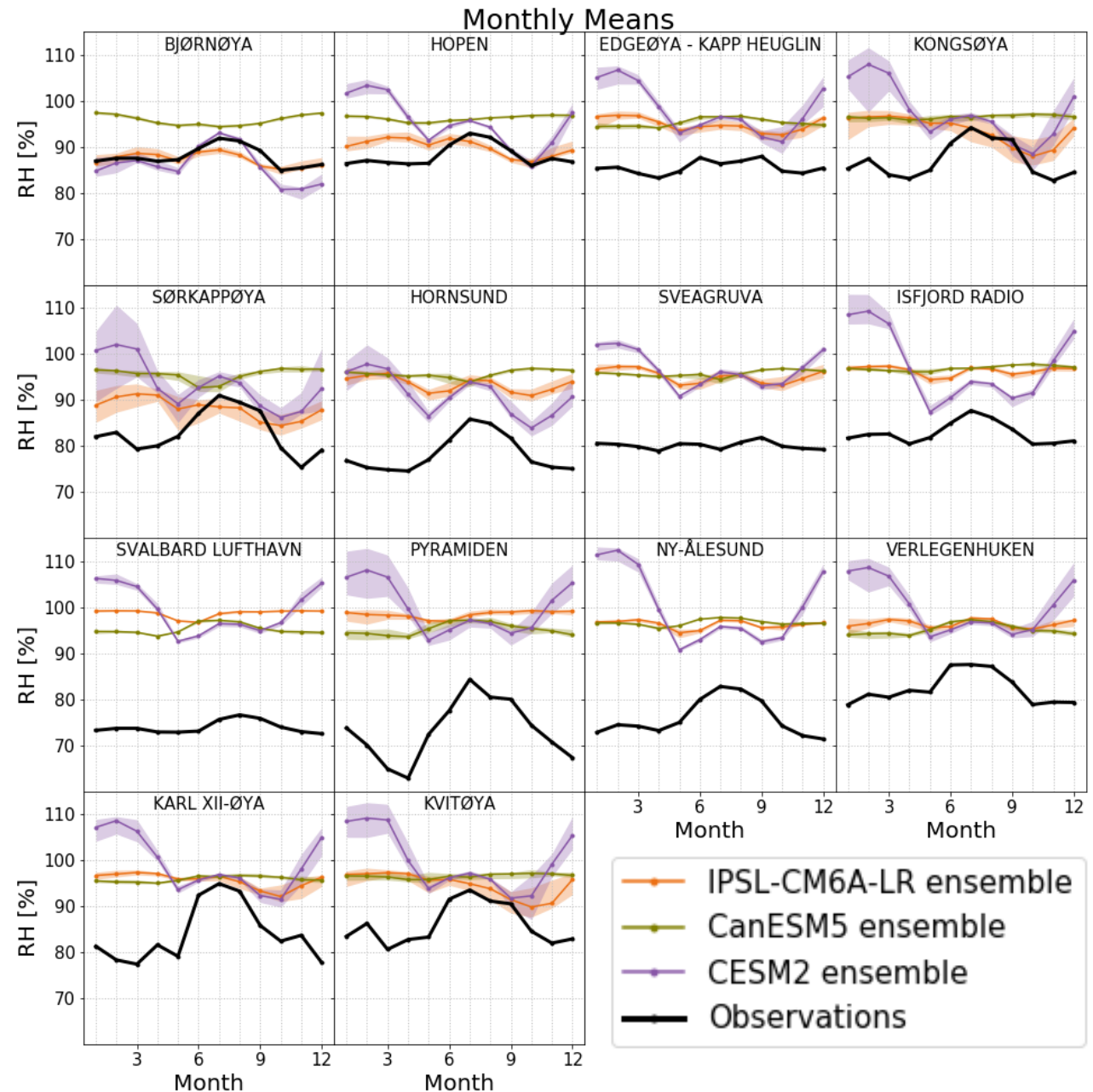
## #3: Correlations

Correlation of model ensemble median time series and observation time series (if  $N \geq 10$ )

# Results

## #1: Monthly Means

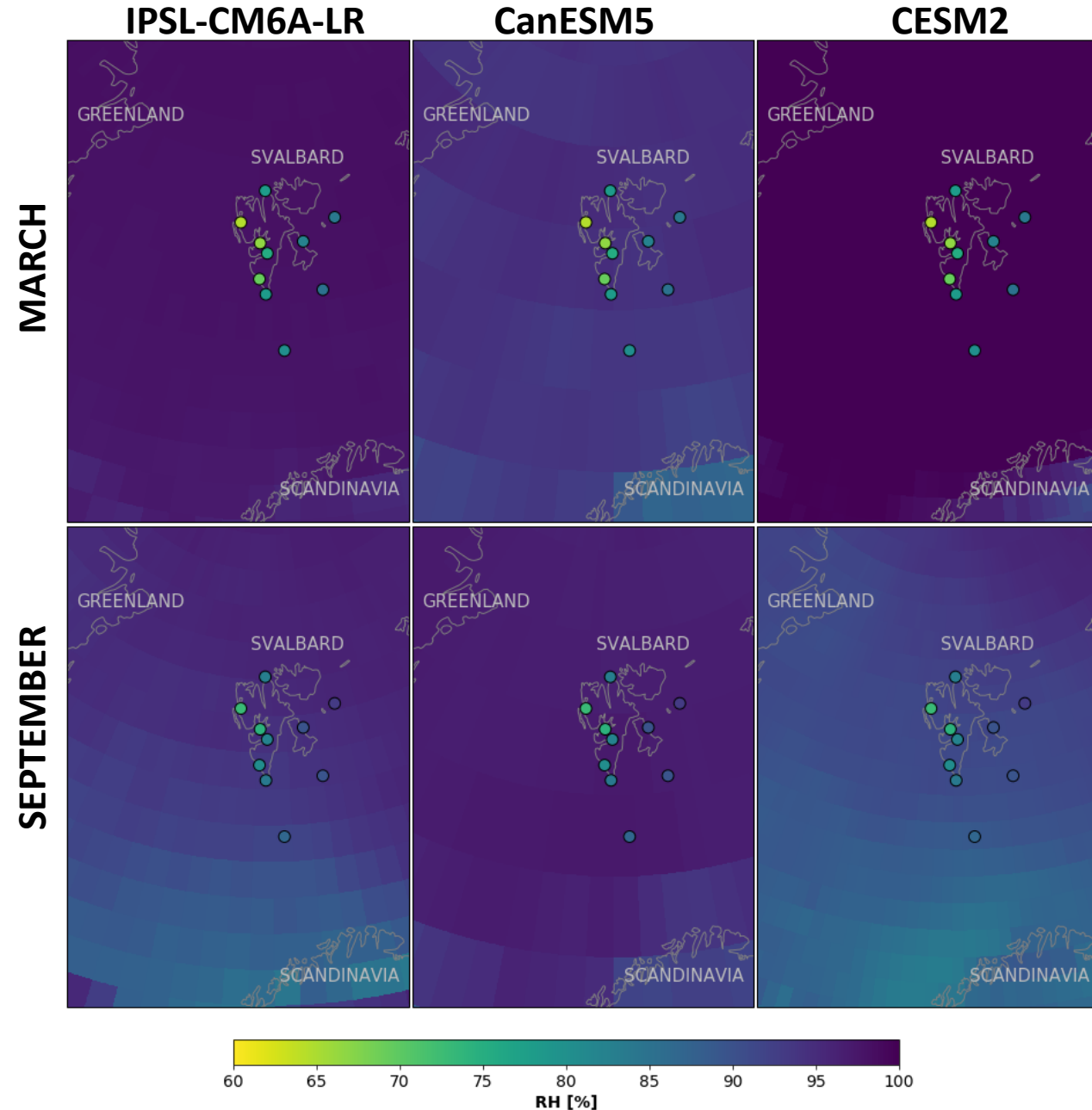
- ☹️ General overestimation
- 😊 Bjørnøya: cycle & values
- ☹️ Sveagruve clear ex of bias
- ☹️ CESM2 simulations with peak in winter



# Results

## #2: Median Maps

- 😞 General overestimation
- 😞 Spatial gradient in measurements not captured by models
- 😐 Mar < Sep seen in measurements only reproduced in CanESM5





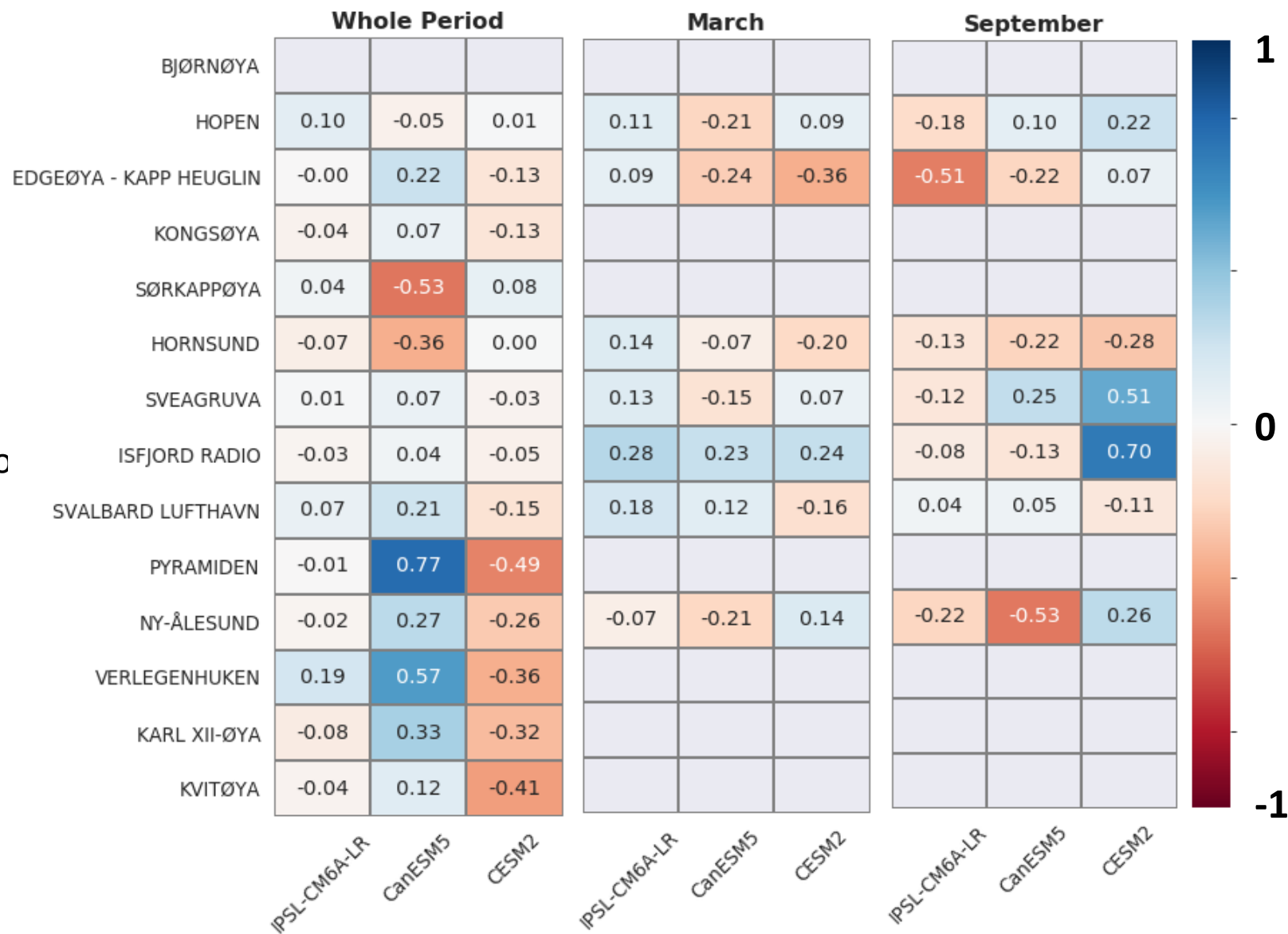
# Results

## #3: Correlations

If ideal: all dark blue

☹️ Many weak and negative correlatio

😊? Whole Year: CanESM5 best  
March: IPSL-CM6A-LR best  
September: CESM2 best



# Conclusions

## Main THM:

- Models overestimate
- Longitudinal variation seen in observations not captured by models
- No clear best model
- No clear month of year where model perform better/worse

## What I have learned:

- Work with xarrays
- Why RH is important for aerosols

## Outlook:

- Model assessment by stdev, bias, and RMSE

