Extending limited in situ mountain weather observations to the baseline climate: A true verification case study

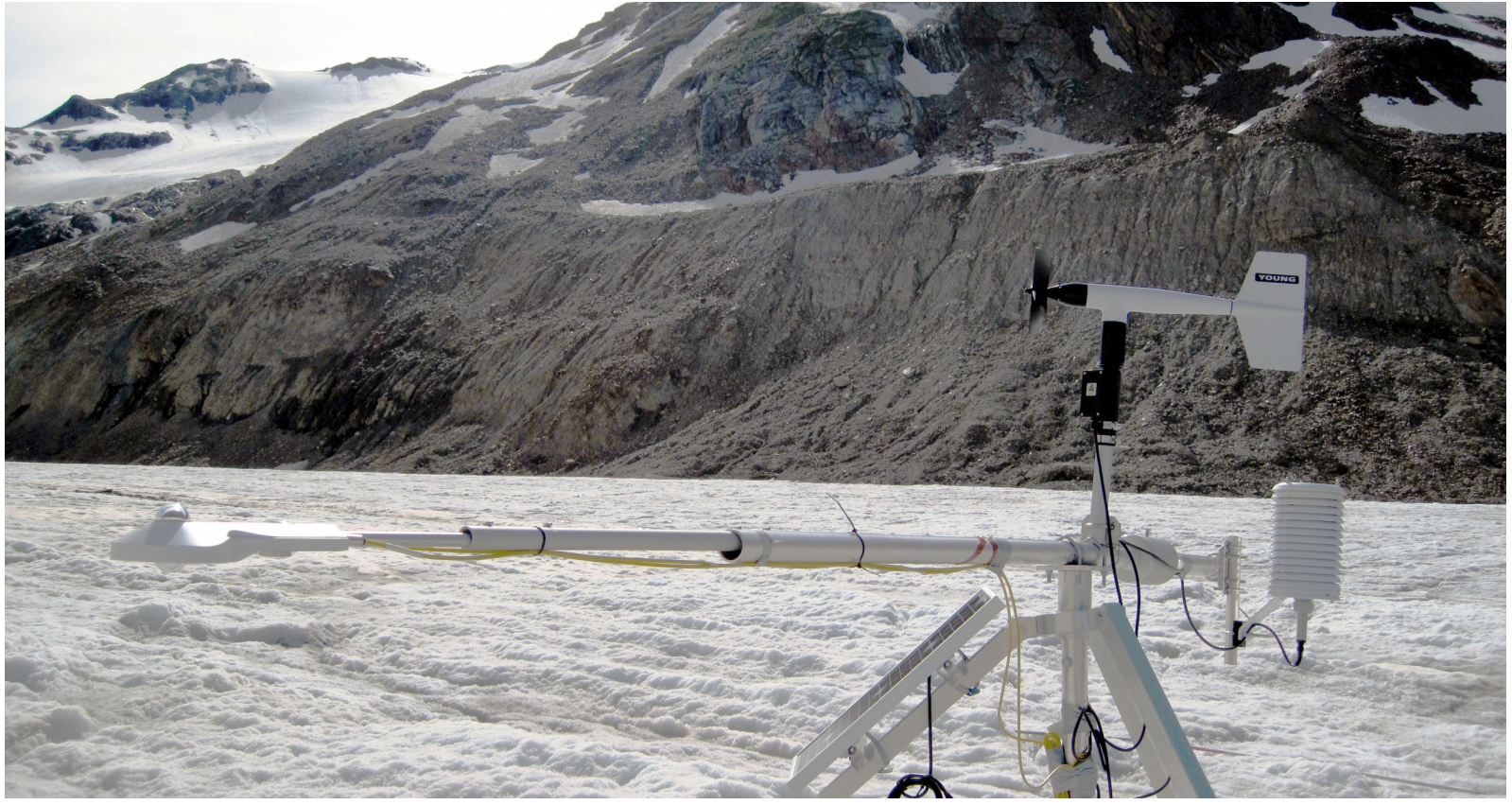
Marlis Hofer and Johannes **Horak**

IMC – 09.09.2019

universität
innsbruck

The Problem

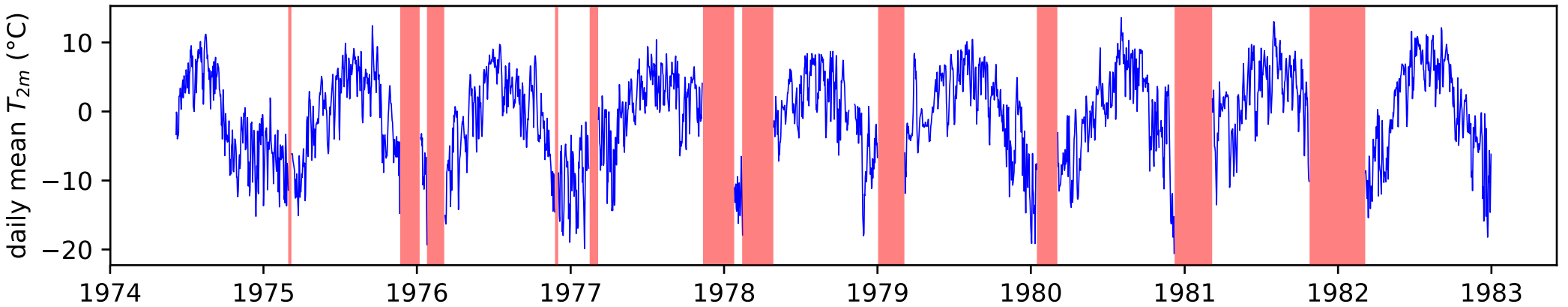
limited observations for **high mountain regions**



The Problem

limited observations for **high mountain regions**

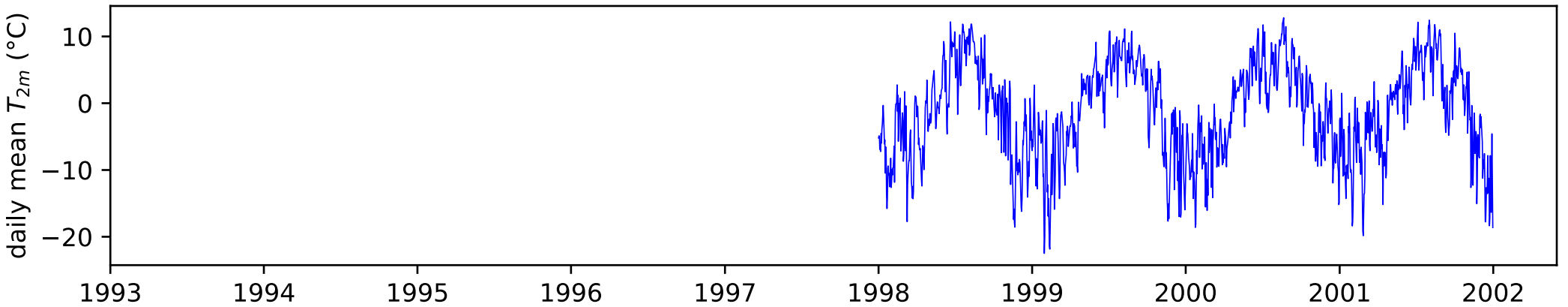
- gaps



The Problem

limited observations for **high mountain regions**

- gaps
- short duration



sDoG

a statistical downscaling tool (linear regression)

combines

- in situ observations with
- global reanalysis datasets

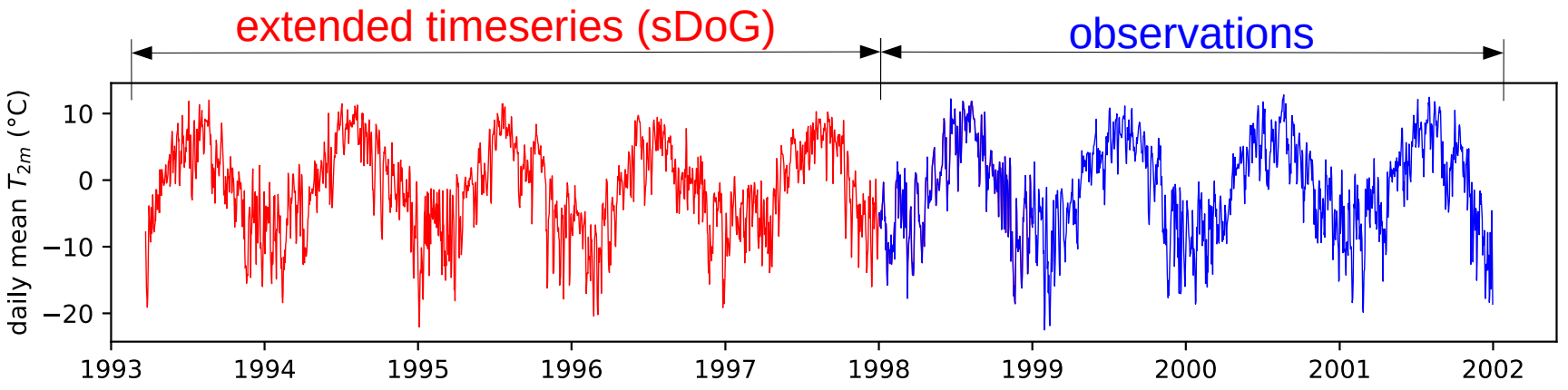
sDoG

a statistical downscaling tool (linear regression)

combines

- in situ observations with
- global reanalysis datasets

Result:



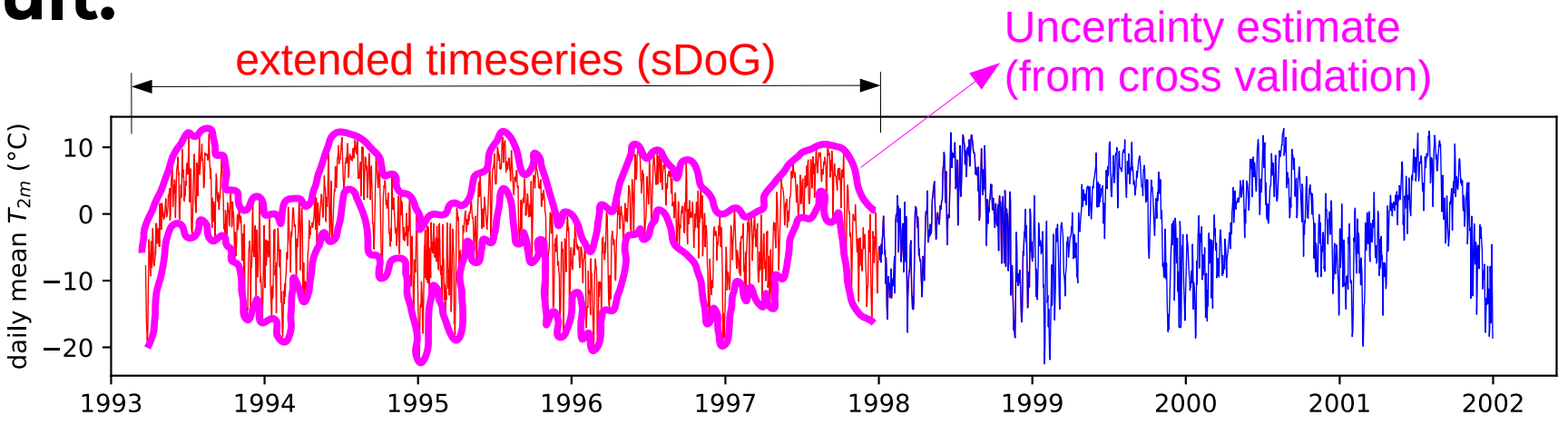
sDoG

a statistical downscaling tool (linear regression)

combines

- in situ observations with
- global reanalysis datasets

Result:



Investigate: **daily mean temperature**

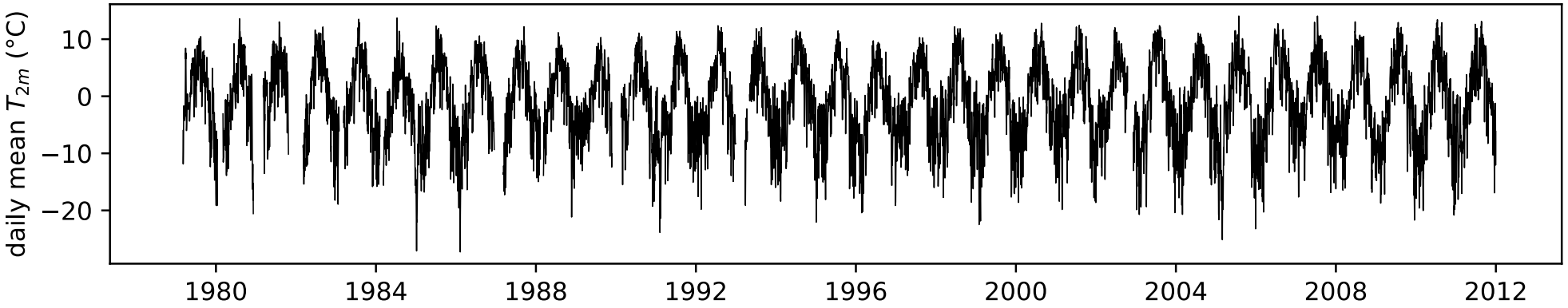
Does sDoG **outperform** selected models?

- ERA-Interim, ERA5, ALARO, …

Is the estimated **uncertainty reliable**?

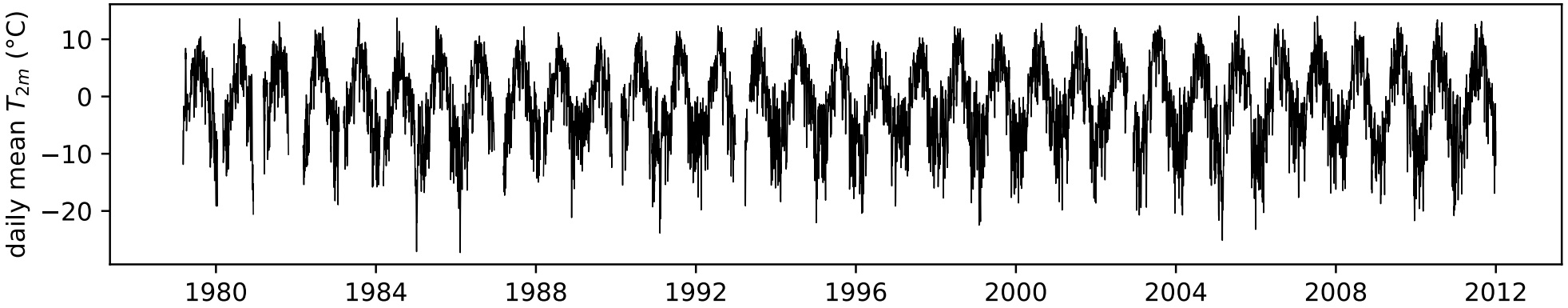
Methodology

Full timeseries at Vernagtbachstation (2640 m MSL)

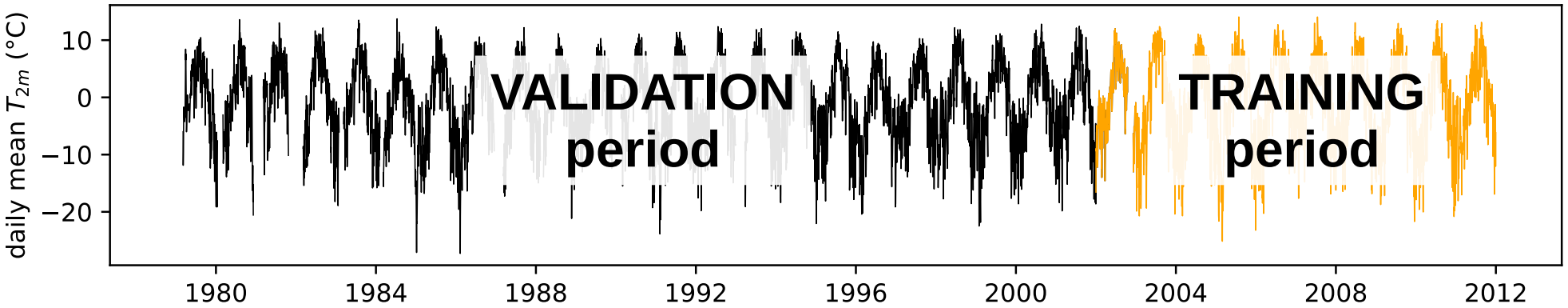


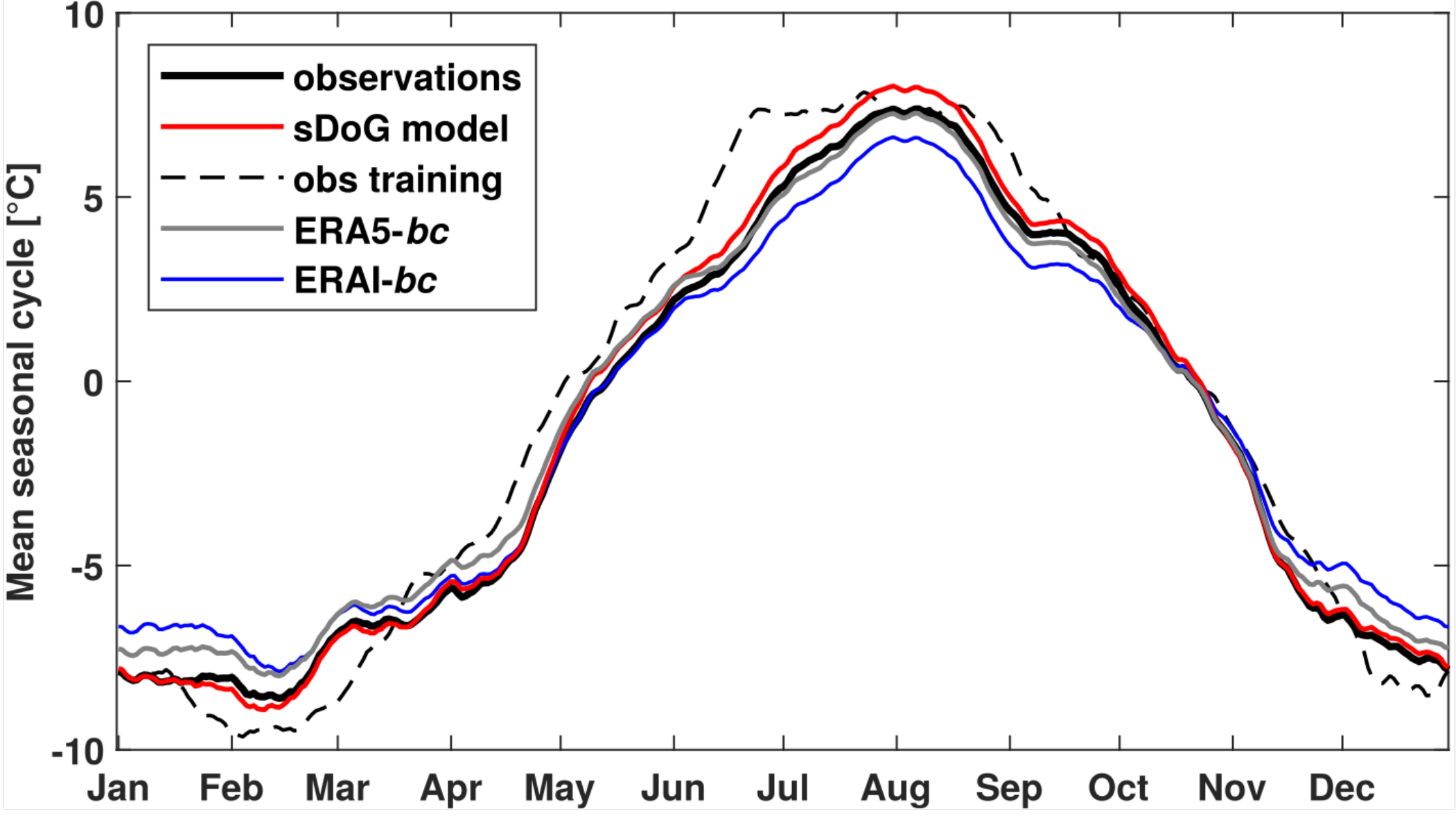
Methodology

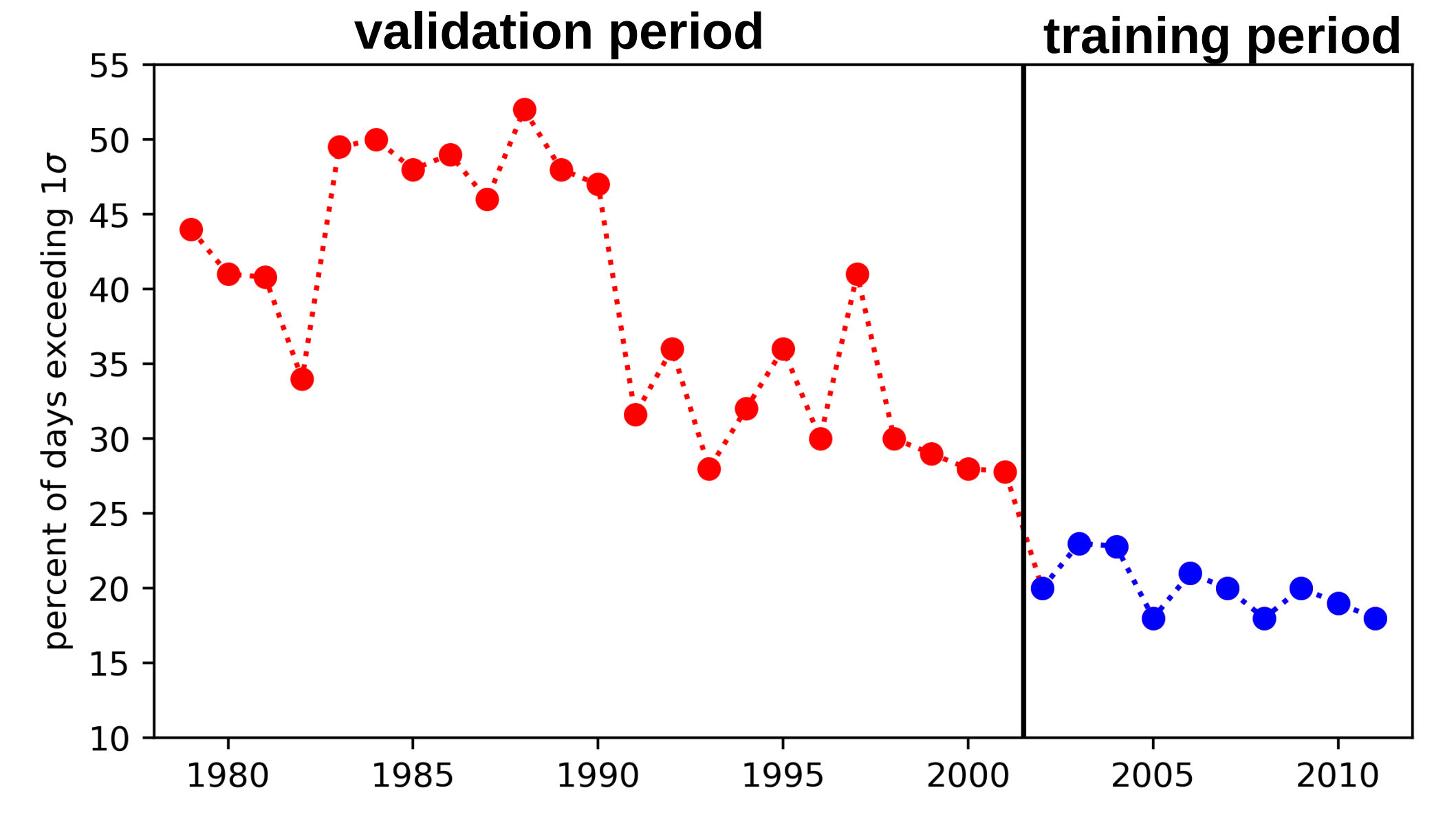
Full timeseries at Vernagtbachstation (2640 m MSL)

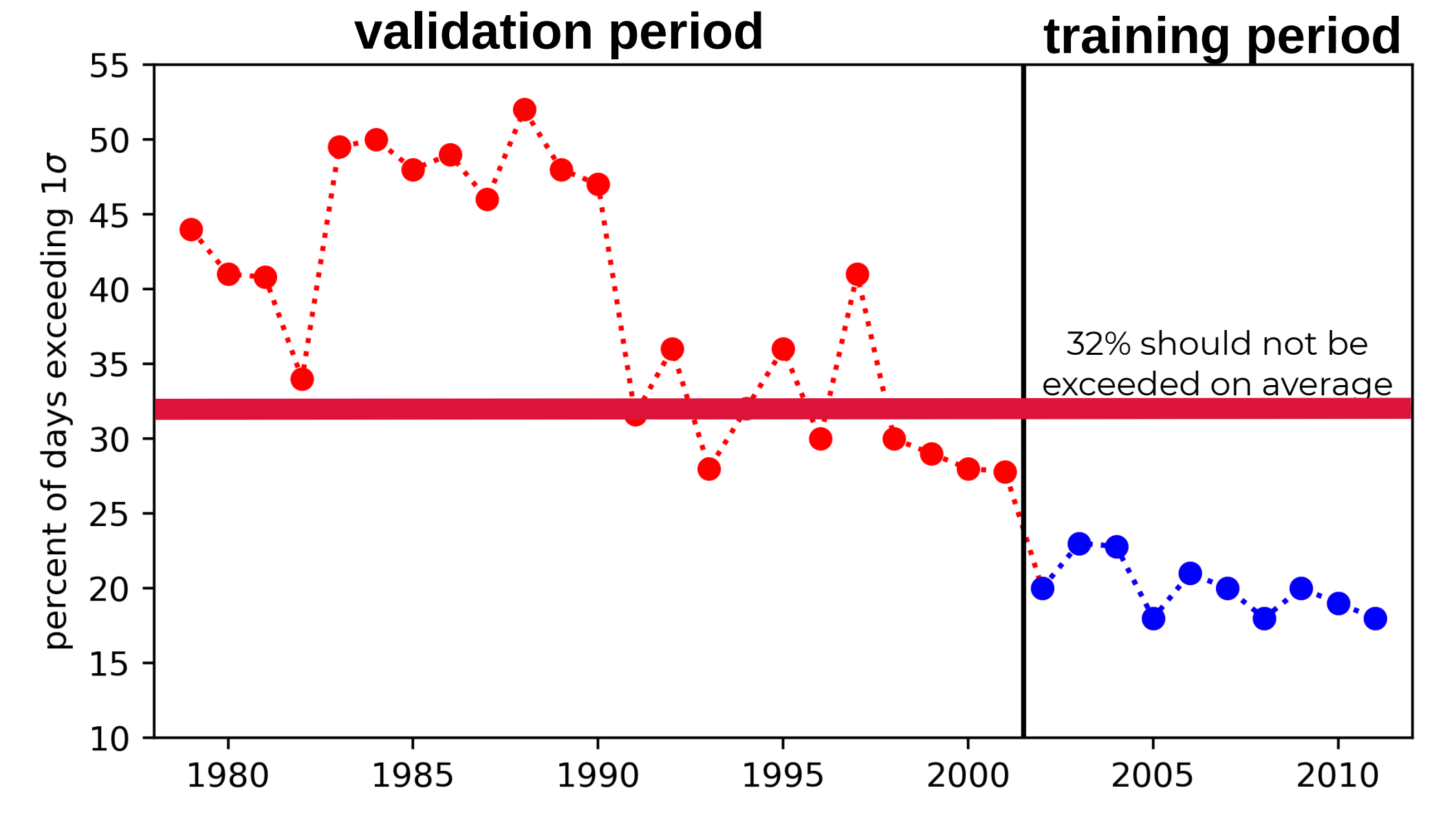


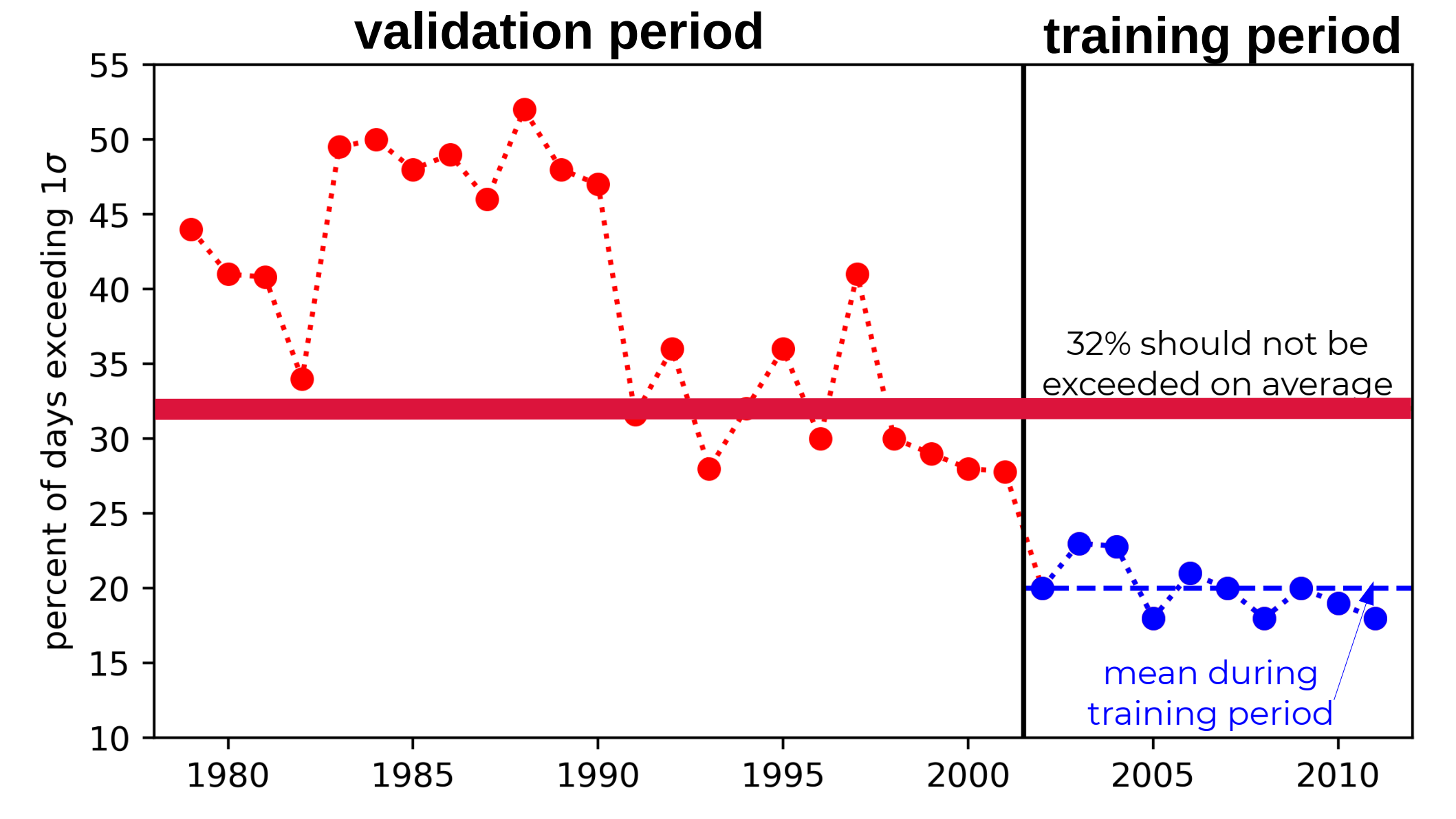
Split in training and validation period

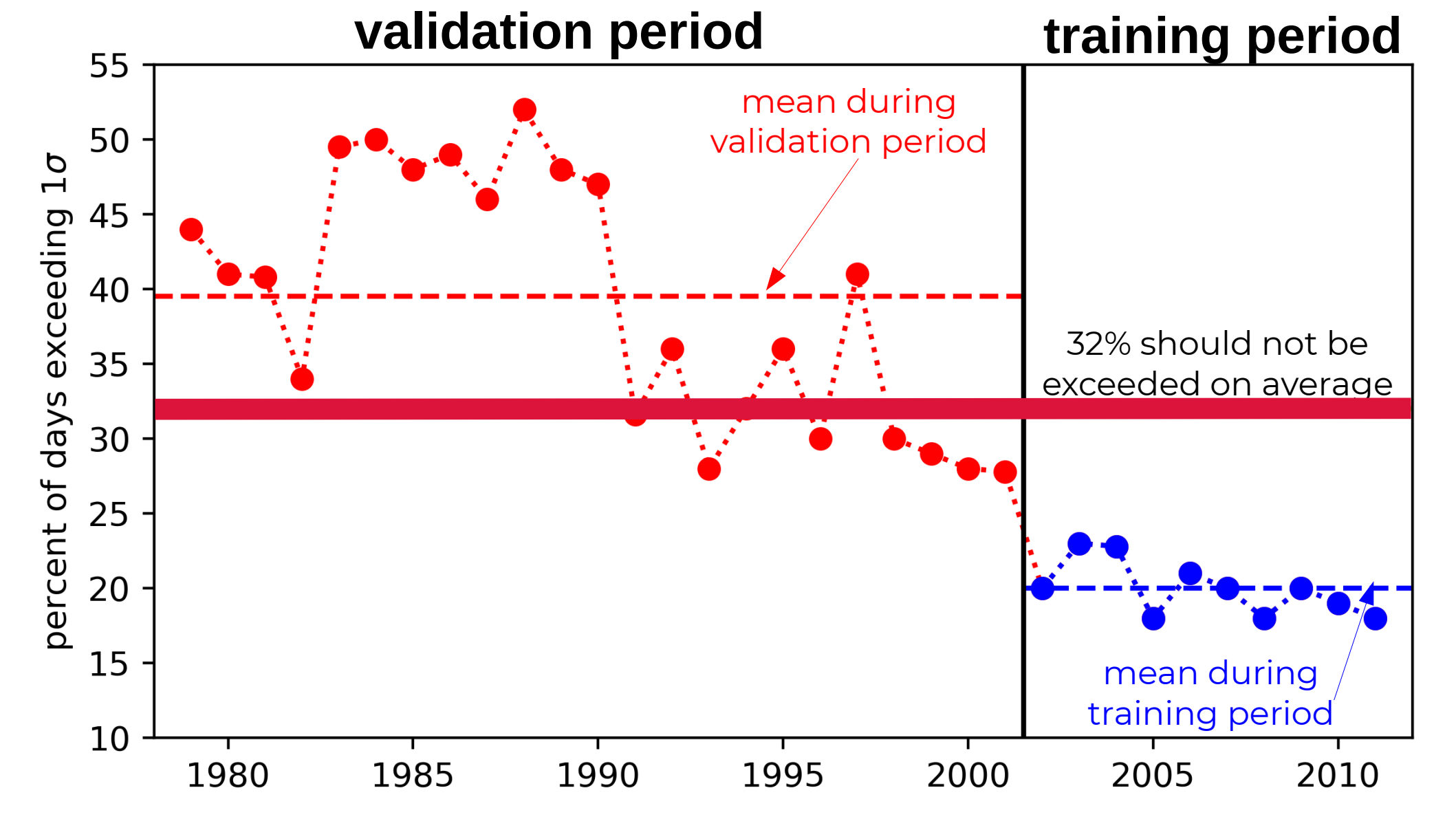


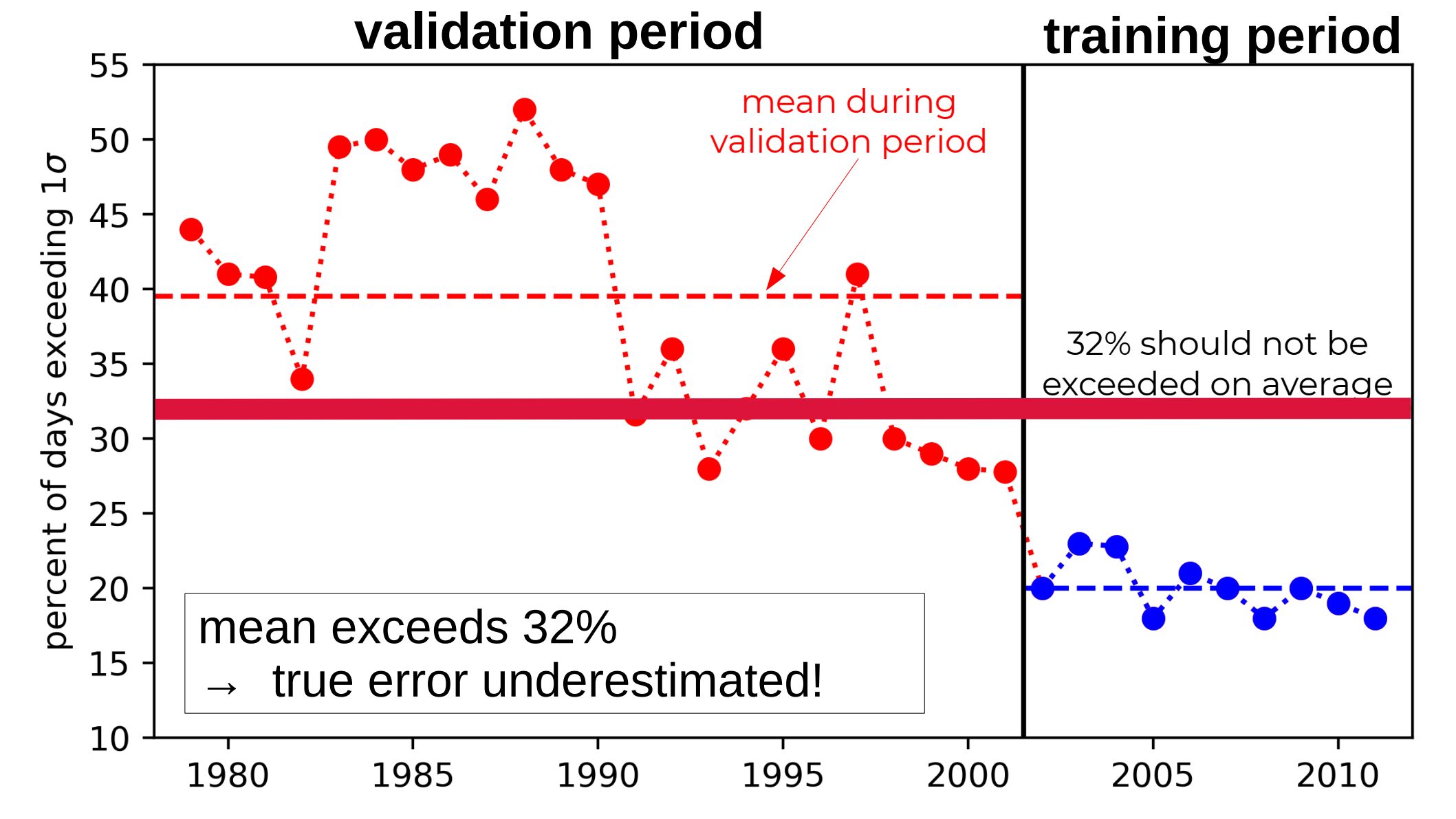

observations
sDoG model
obs training
ERA5-bc
ERAI-bc
Mean seasonal cycle [°C]
10
5
0
-5
-10
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


validation period
training period
percent of days exceeding 1σ
55
50
45
40
35
30
25
20
15
10
1980
1985
1990
1995
2000
2005
2010


validation period
training period
percent of days exceeding 1σ
55
50
45
40
35
30
25
20
15
10
1980
1985
1990
1995
2000
2005
2010
32% should not be
exceeded on average


validation period
training period
percent of days exceeding 1σ
55
50
45
40
35
30
25
20
15
10
1980
1985
1990
1995
2000
2005
2010
32% should not be
exceeded on average
mean during
training period


validation period
training period
mean during
validation period
32% should not be
exceeded on average
mean during
training period
percent of days exceeding 1σ
55
50
45
40
35
30
25
20
15
10
1980
1985
1990
1995
2000
2005
2010


validation period
training period
mean during
validation period
32% should not be
exceeded on average
mean exceeds 32%
→ true error underestimated!
percent of days exceeding 1σ
55
50
45
40
35
30
25
20
15
10
1980
1985
1990
1995
2000
2005
2010

Thank you!