Much ado about wind warnings

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Questions

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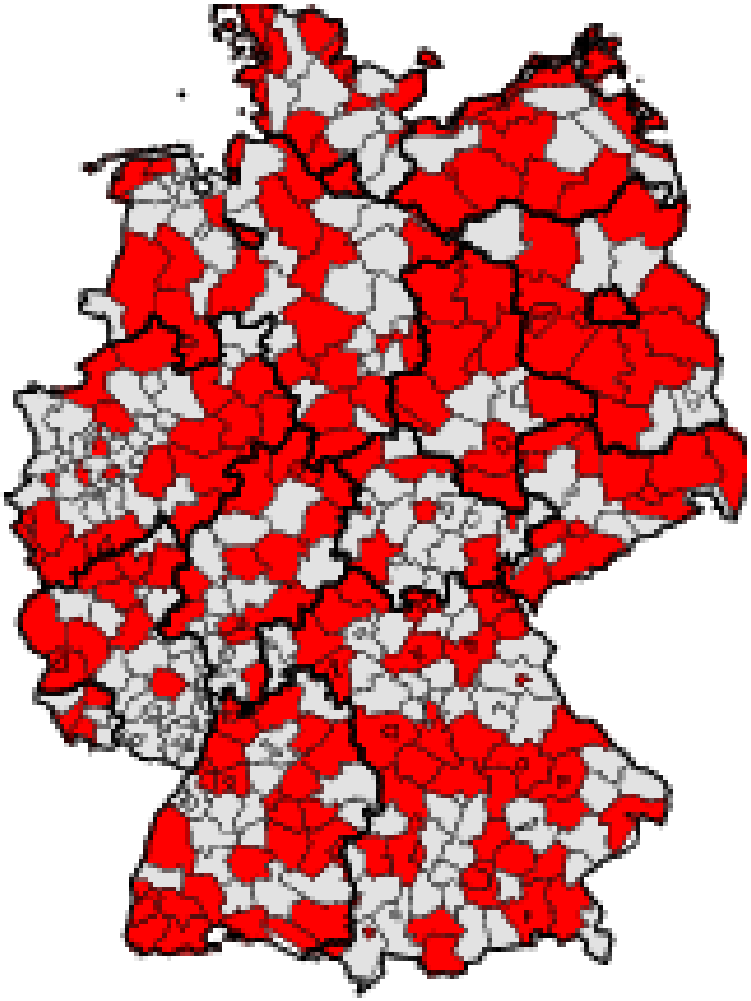
Importance
Missing events
Overforecasting
Lack of observations
Getting better
Biggest problem

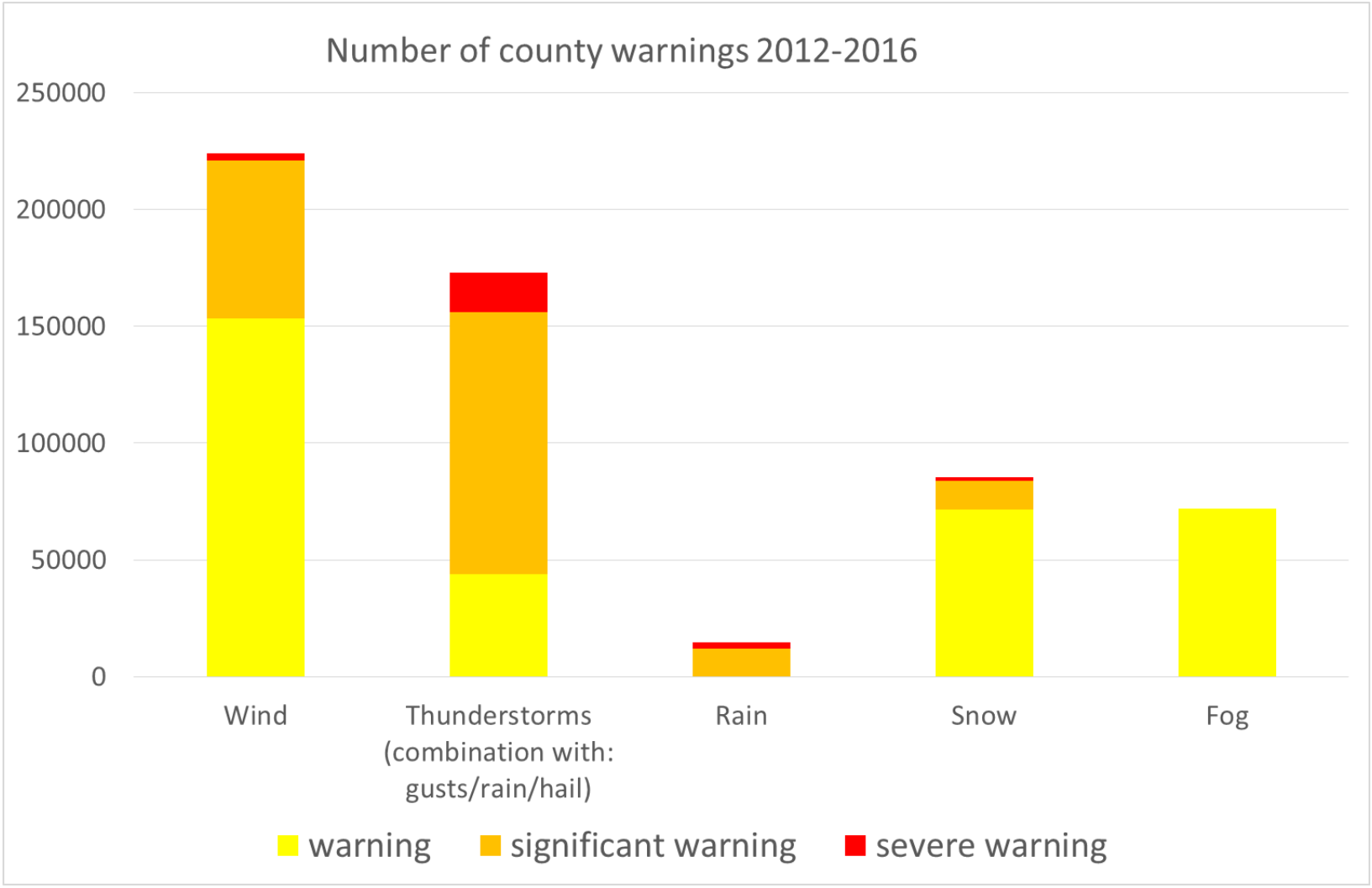
?

Counties with gust measurements in Germany



- In about half of the counties is a station
- A dozen have more than one station

Importance


Number of county warnings 2012-2016
250000
200000
150000
100000
50000
0
Wind
Thunderstorms (combination with: gusts/rain/hail)
Rain
Snow
Fog
warning
significant warning
severe warning

Contingency table Winter, hourly ver.

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	observation in m/s and Bft						absolute sum warnings
	<14	14-17	18-24	25-28	29-32	33-37	
	0-6	7	8-9	10	11	12	
warning							
no warning	**3973527**	32808	**1411**	**23**	**1**	**2**	4007772
gale	285215	**120999**	13718	**79**	**5**	**3**	420019
strong gale	56958	73247	**46715**	1349	**109**	**8**	178386
storm	2503	3925	8381	**1303**	157	**18**	16287
violent storm	42	395	2215	822	**296**	43	3813
hurrican force	10	69	441	313	188	**53**	1074
absolute sum obs	4318255	231443	72881	3889	756	127	4627351

Conditional distribution of **missed** cases

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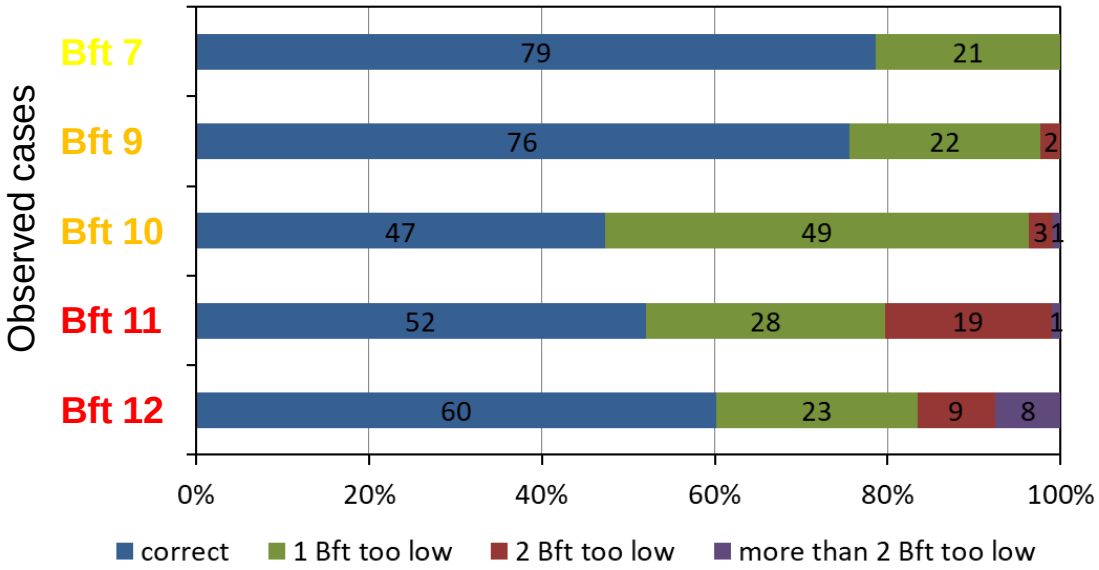
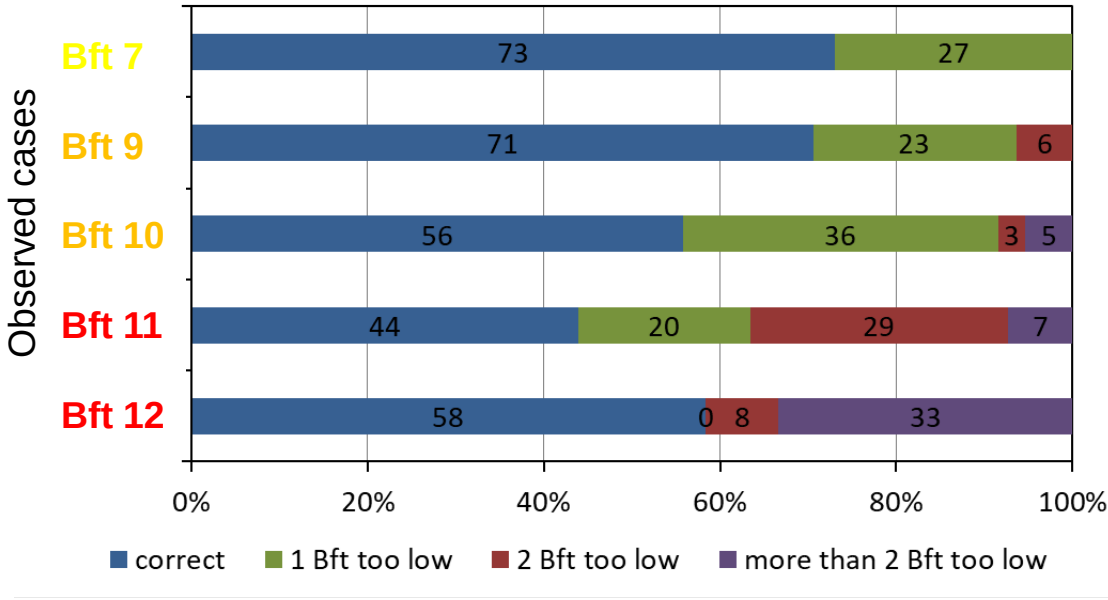
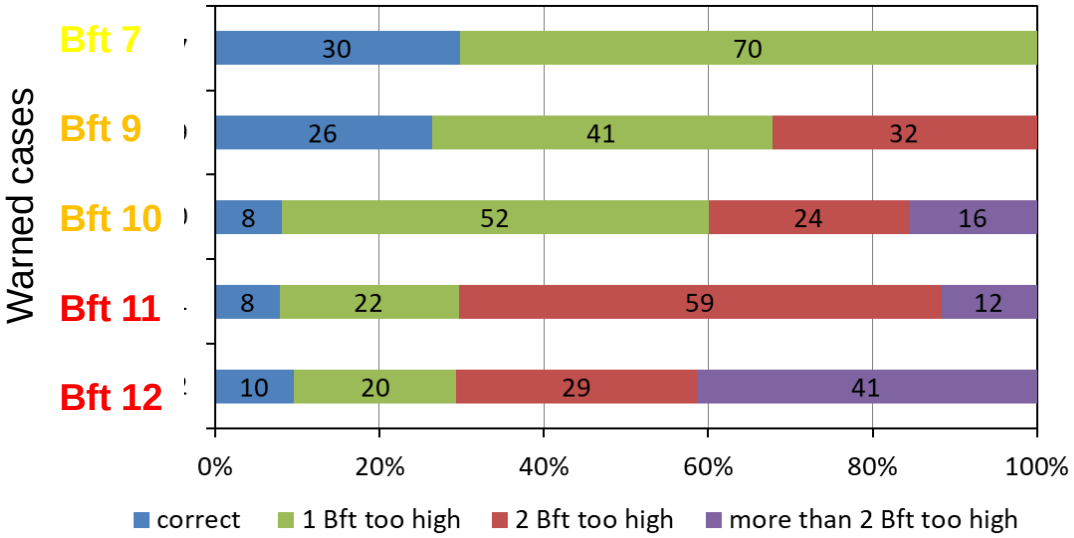


Winter

Summer

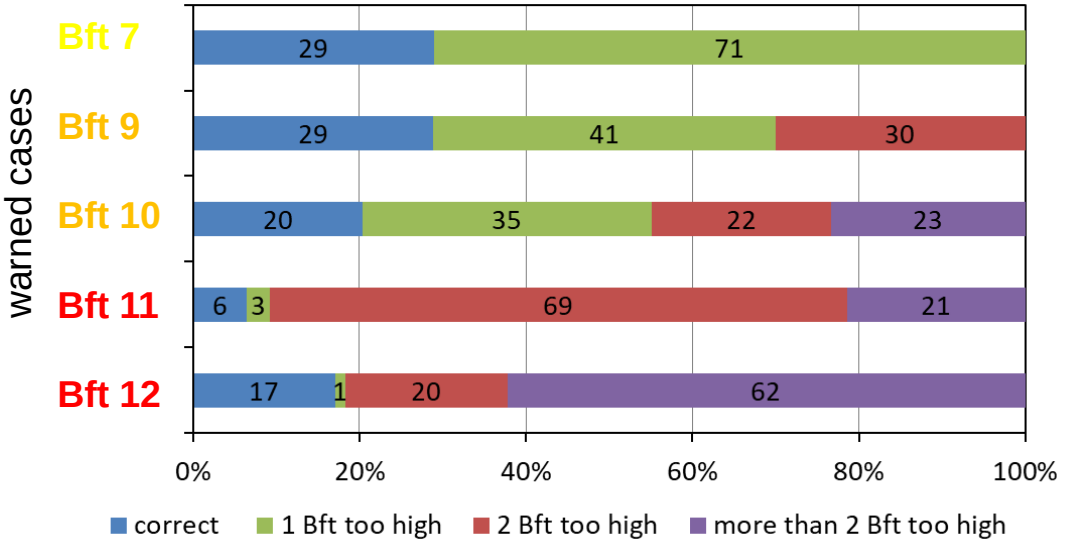


Conditional distribution of **overforecasting**



Winter

Summer



Influence of lack of observations

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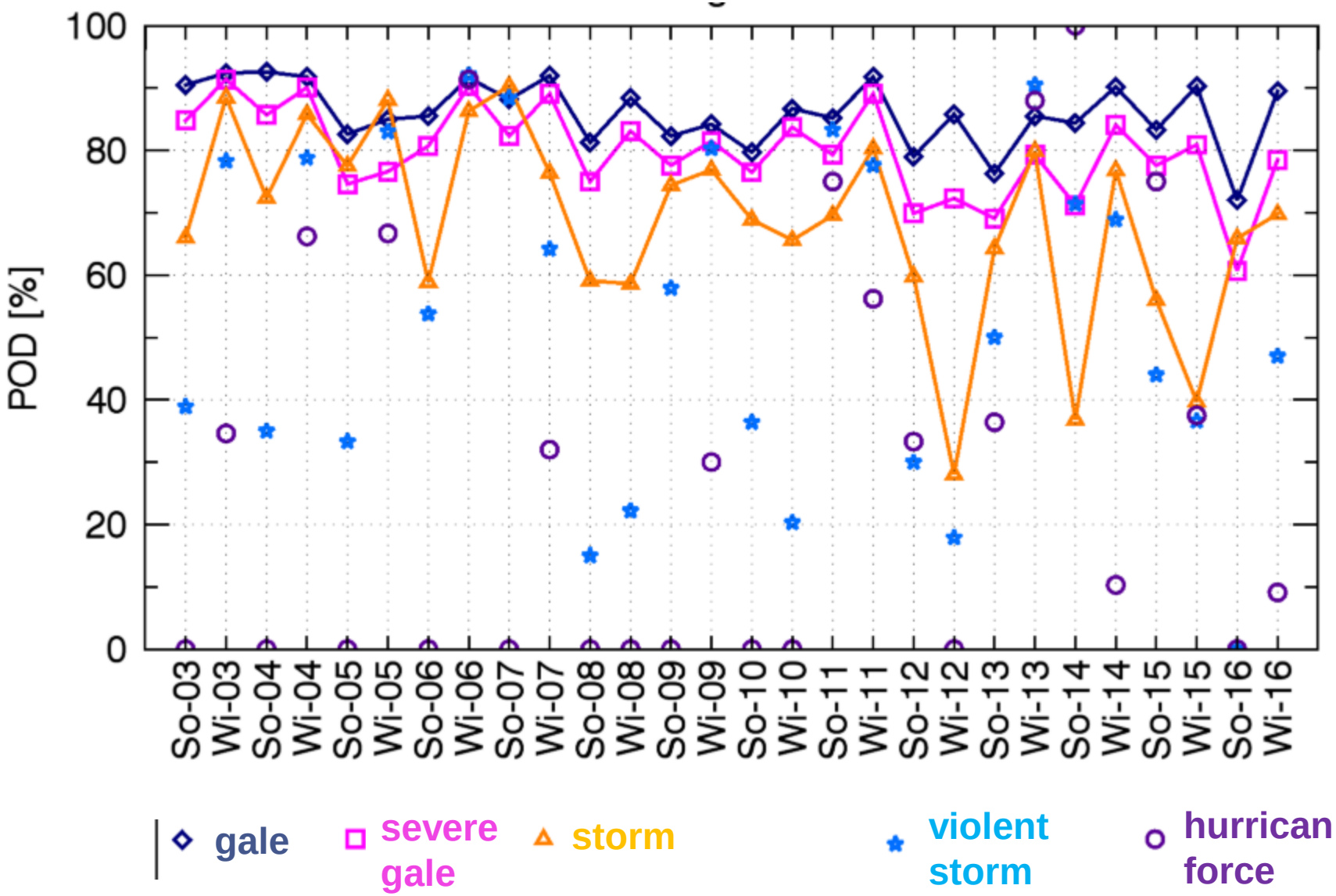
Different verification results in counties with more than one station

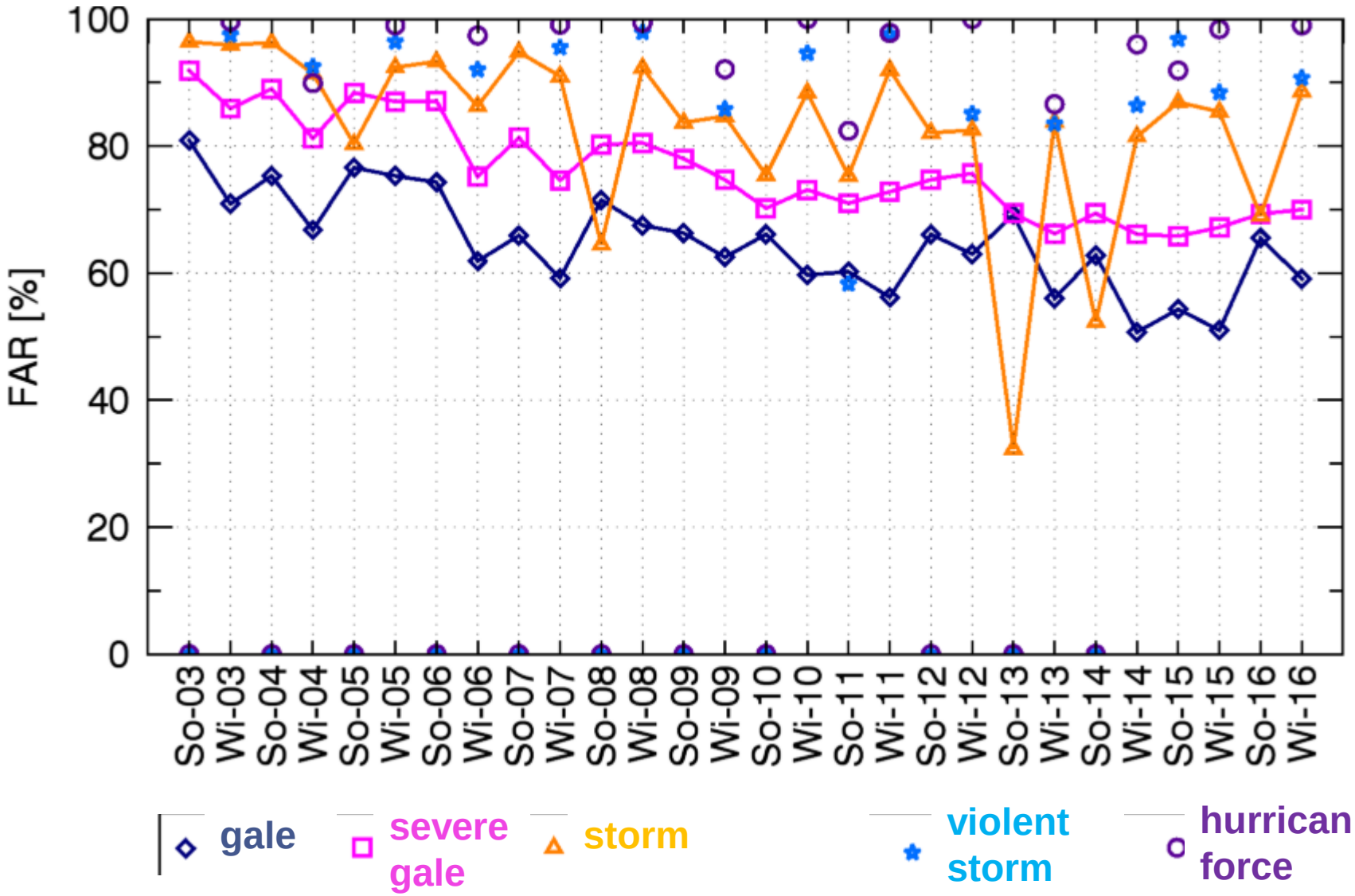
Mean difference between highest and lowest score:

POD: 5 – 10 %
FAR: 10 - 15 %

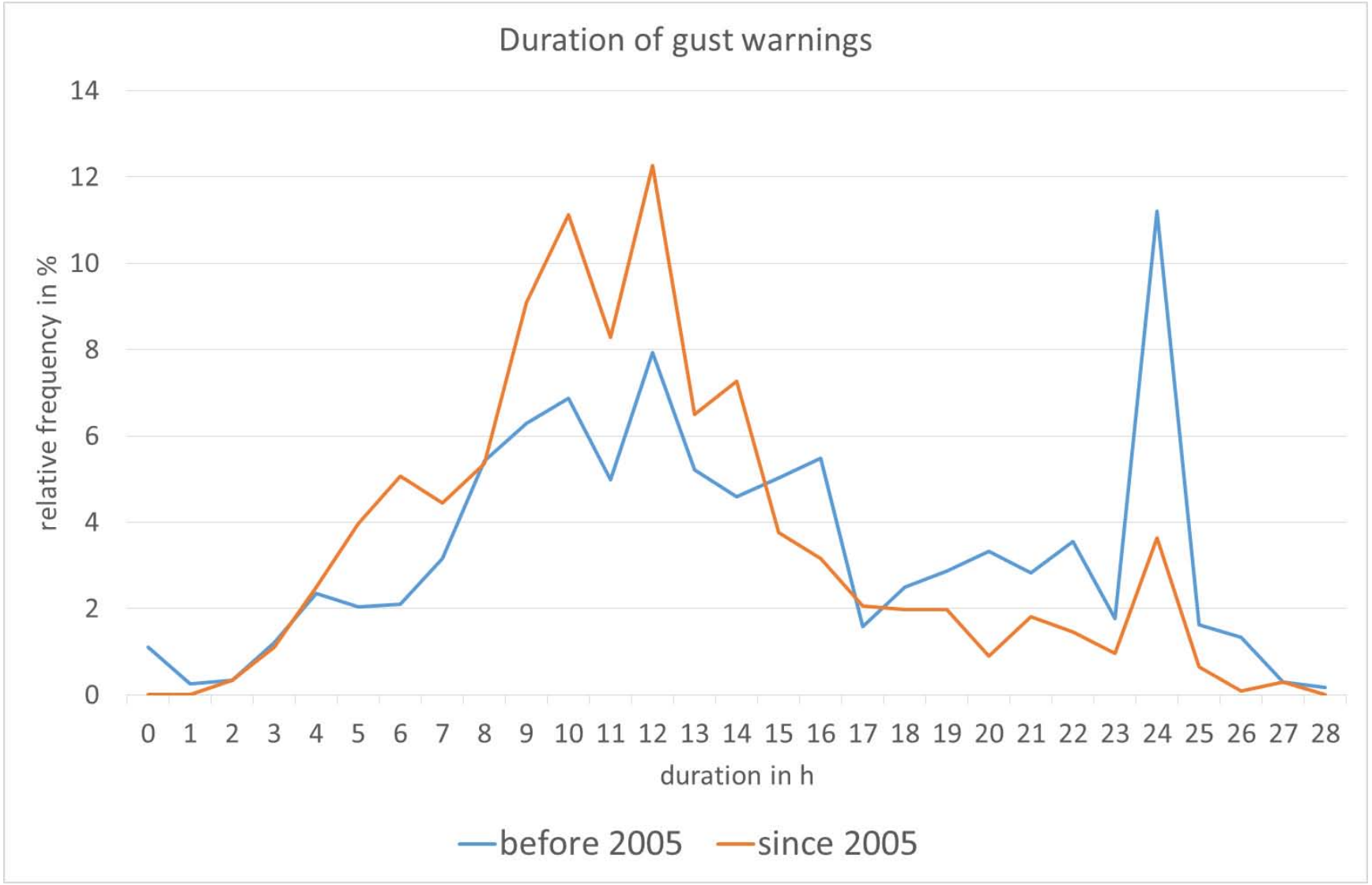
Probability Of Detection



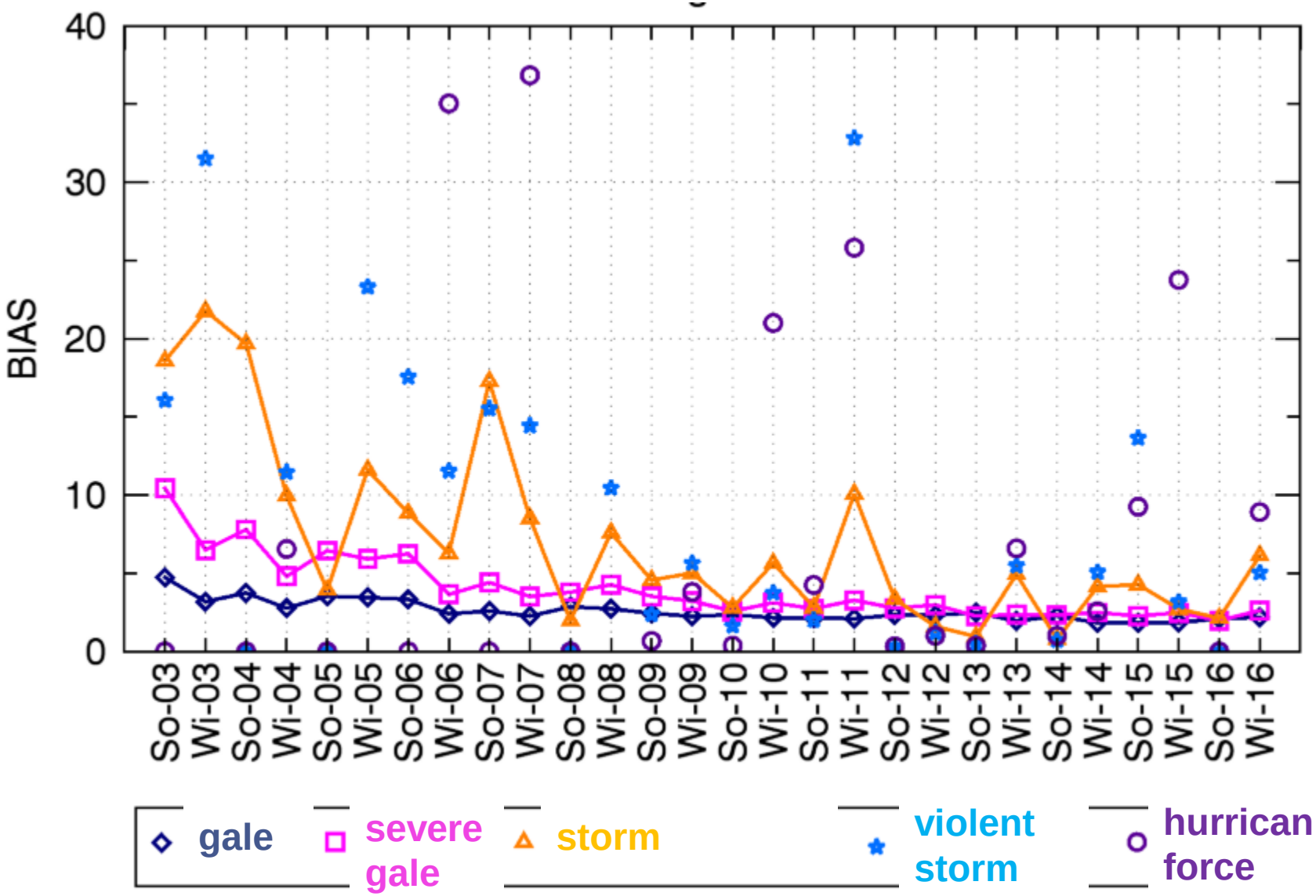
False Alarm Ratio



Change in duration of gust warnings



Frequency bias



Summary

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- wind warnings keep forecasters **busy**
- wind warnings **hardly ever miss** an event completely, but sometimes the **severity is underestimated**
- strong **overforecasting** → high ratio of **false alarms**
- **lack of observations** → false alarm ratio strongly overestimated
- pronounced **reduction of false alarms** over the last decade, due to a reduction in overforecasting, which is based partly on **changing the operational warning process**
- forecasting the **intensity of convective gusts** remains the **largest problem** in gust prediction