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SUPPORTING MATERIAL: Notes on 1991–2020 wind speed climatology

based on NORA3 near-surface data

Cristian Lussana, Inger Hanssen-Bauer, Jan Erik Haugen, Andreas Dobler,
Hans Olav Hygen, Anita Verpe Dyrddal and Hilde Haakenstad

The Norwegian Meteorological Institute, Oslo, Norway



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Abstract This documents includes the supporting material, mostly figures, of the MET report 04/2022.	
Keywords climatology, wind speed, NORA3, Norway	

Disciplinary signature
Hans Olav Hygen

Responsible signature
Cecilie Stenersen

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1 Introduction

This documents includes the supporting material, mostly figures, of the MET report 04/2022.

2 Methods

This documents includes the supporting material, mostly figures, of the MET report 04/2022.

3 Wind speed climatology over land

3.1 Annual aggregated variables

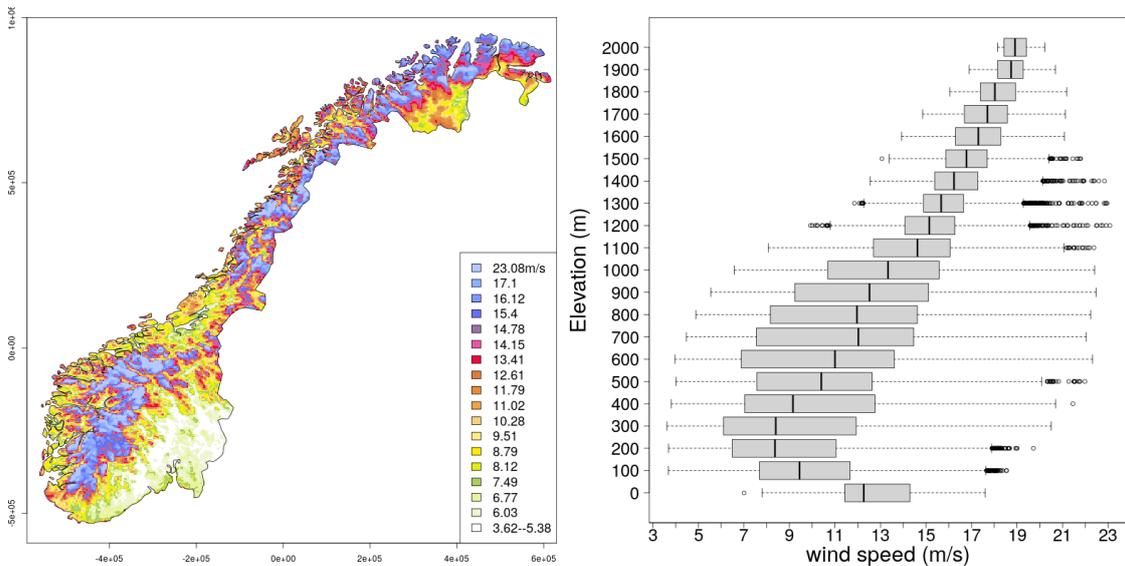


Figure 1: 30-year average (1991–2020) of the 99-th percentile of the annual 10-metre wind speed. Each of the 30 annual values was derived from NORA3 on the basis of all daily mean 10-metre wind speeds.

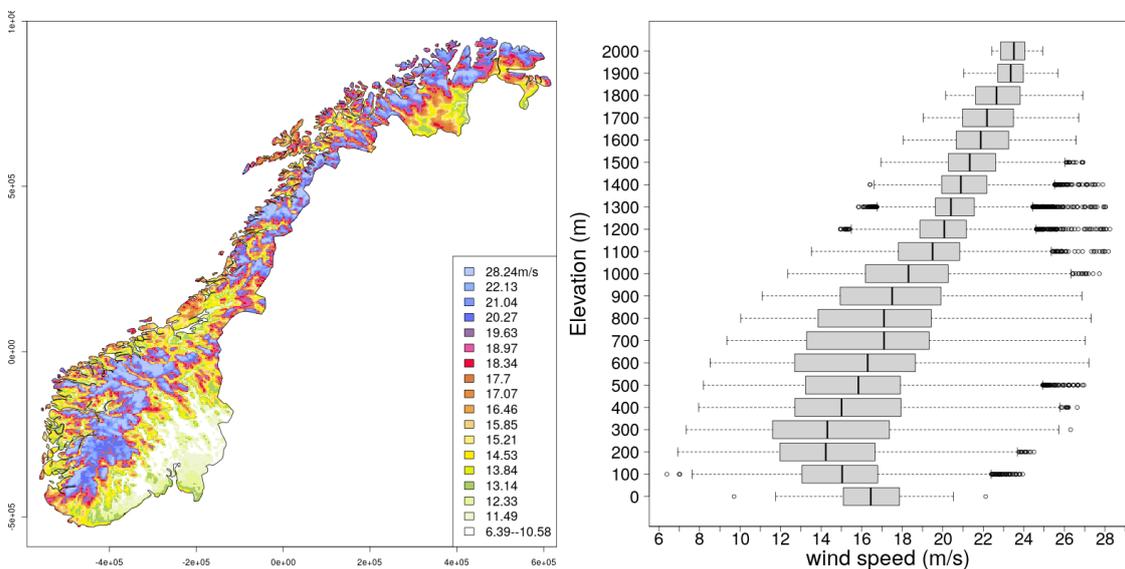


Figure 2: 30-year average (1991–2020) of the 99-th percentile of the annual 100-metre wind speed. Each of the 30 annual values was derived from NORA3 on the basis of all daily mean 100-metre wind speeds.

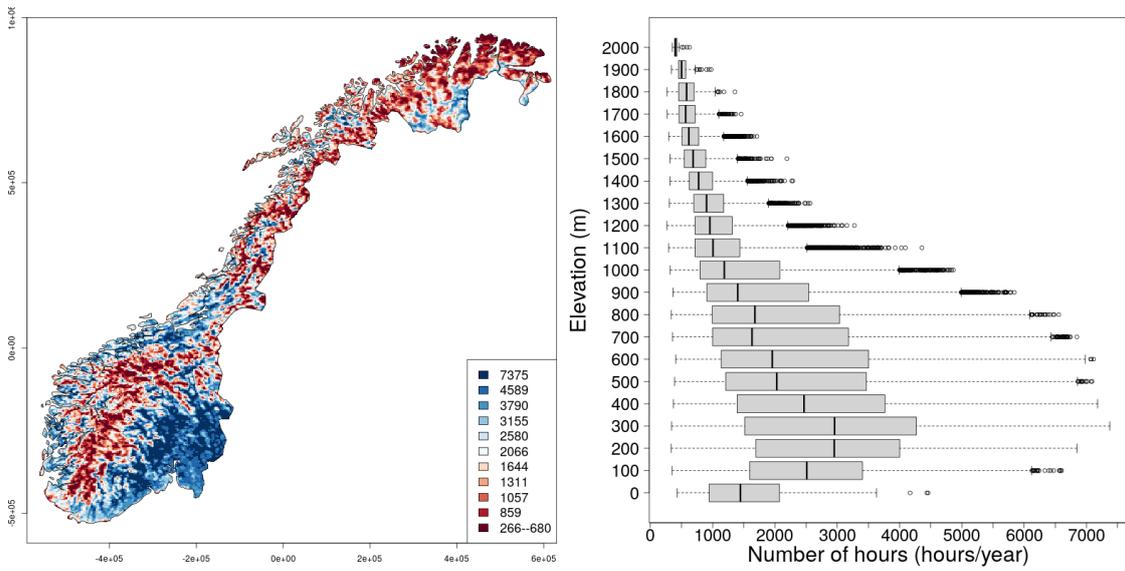


Figure 3: 30-year average (1991–2020) of the number of hours in a year with 10-metre wind speed less than 2 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 10-metre wind speeds.

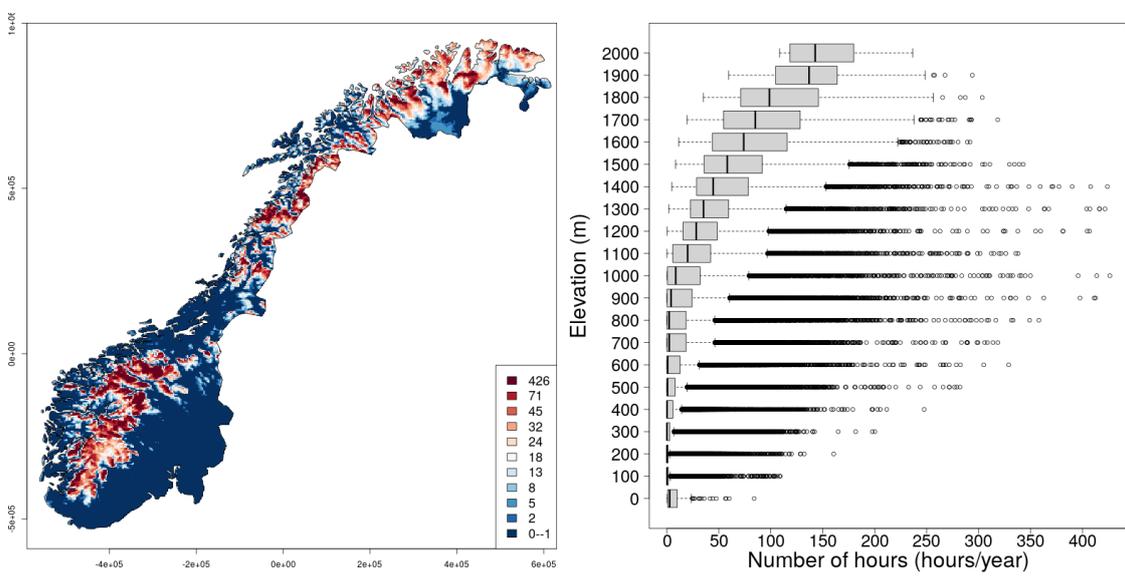


Figure 4: 30-year average (1991–2020) of the number of hours in a year with 10-metre wind speed greater than 20 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 10-metre wind speeds.

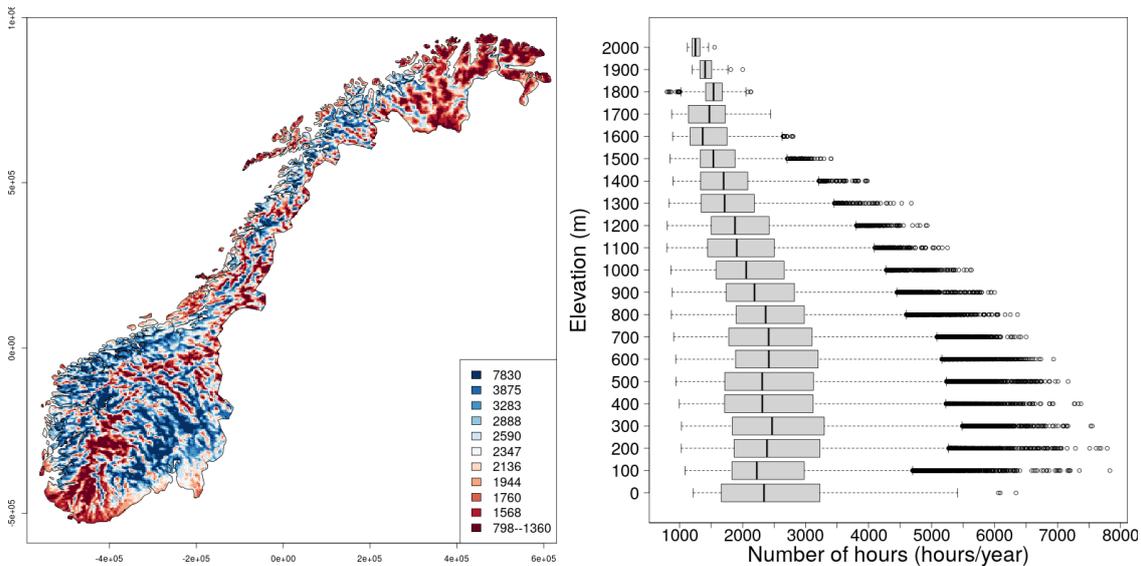


Figure 5: 30-year average (1991–2020) of the number of hours in a year with 100-metre wind speed less than 4 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 100-metre wind speeds.

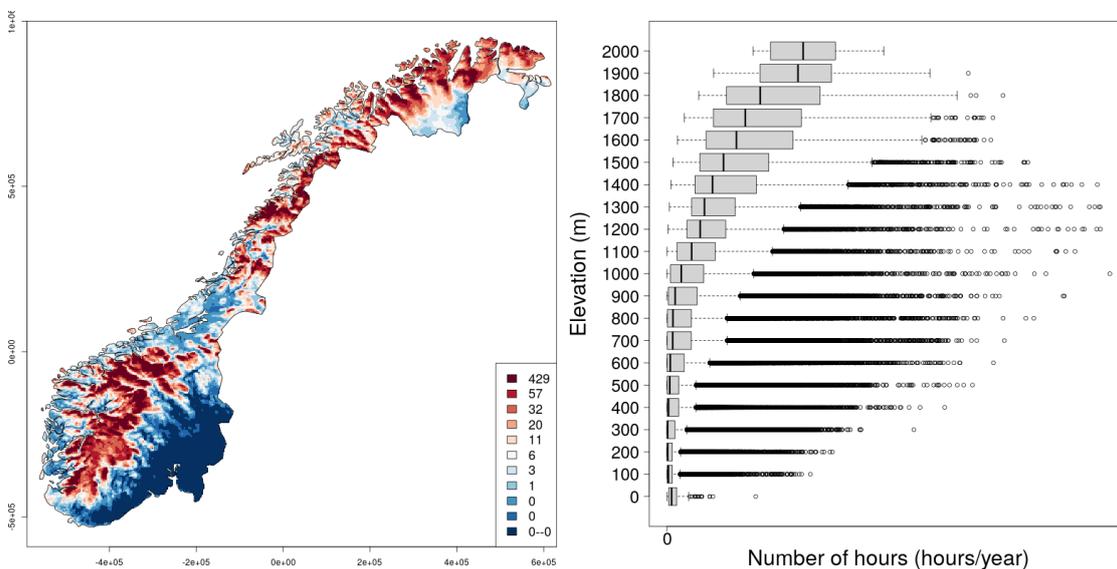


Figure 6: 30-year average (1991–2020) of the number of hours in a year with 100-metre wind speed greater than 25 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 100-metre wind speeds.

3.1.1 Temporal trends

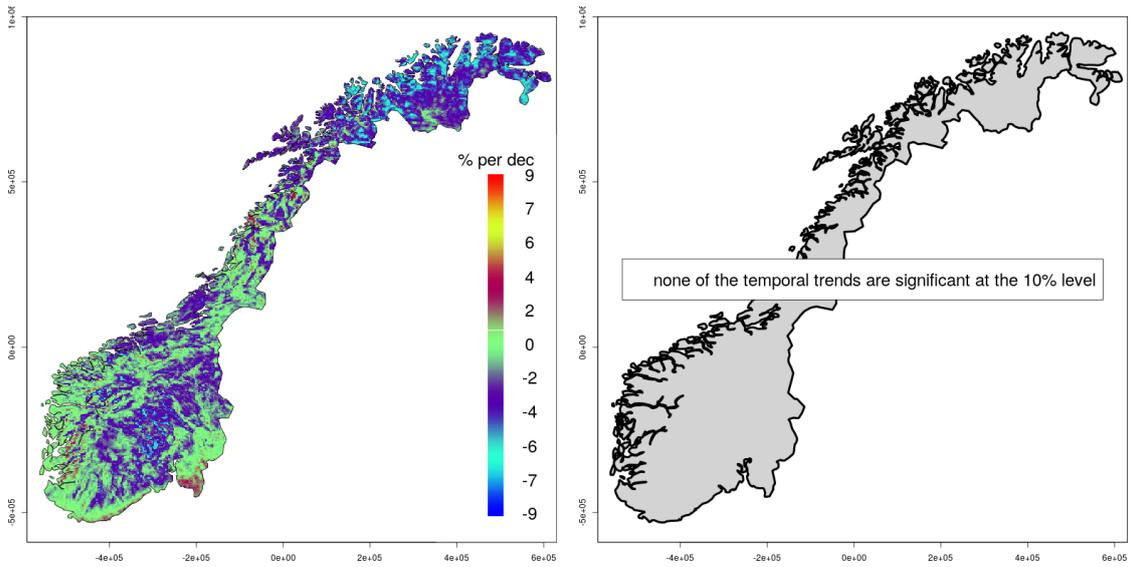


Figure 7: Normalized linear trends (in % of the climate normals per decade) of the annual 99-th percentile of the 10–metre wind speed over the period 1991–2020. At a grid point, each of the 30 annual values used was derived from NORA3 daily averaged 10–metre wind speed. The left panel shows the map of the normalized trends. The global hypothesis of no temporal trends in the data cannot be rejected at any point with 10% significant level.

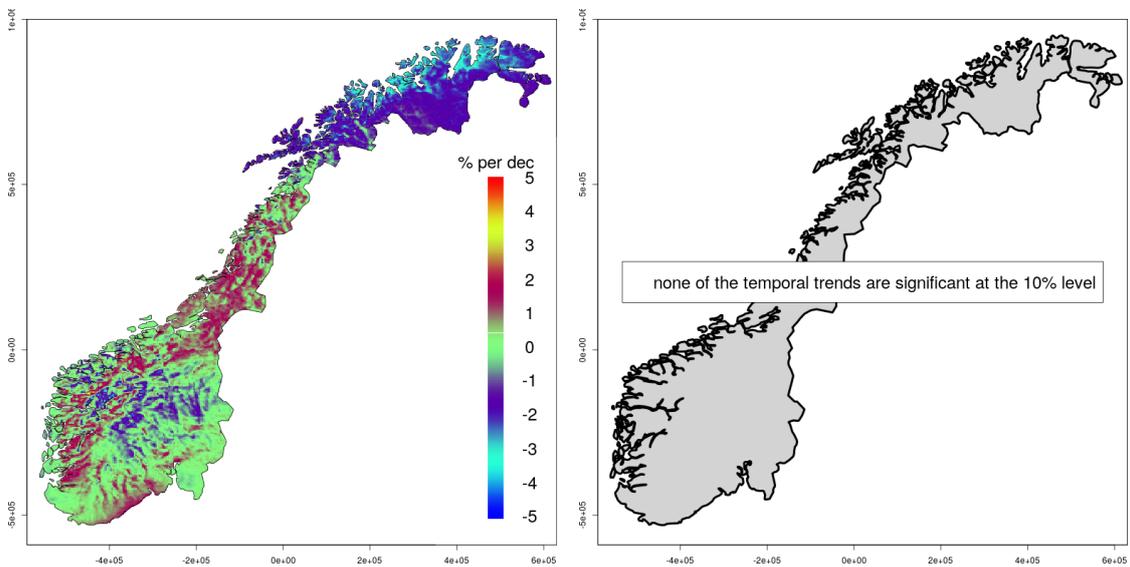


Figure 8: Normalized linear trends (in % of the climate normals per decade) of the annual averaged 100–metre wind speed over the period 1991–2020. At a grid point, each of the 30 annual values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The global hypothesis of no temporal trends in the data cannot be rejected at any point with 10% significant level.

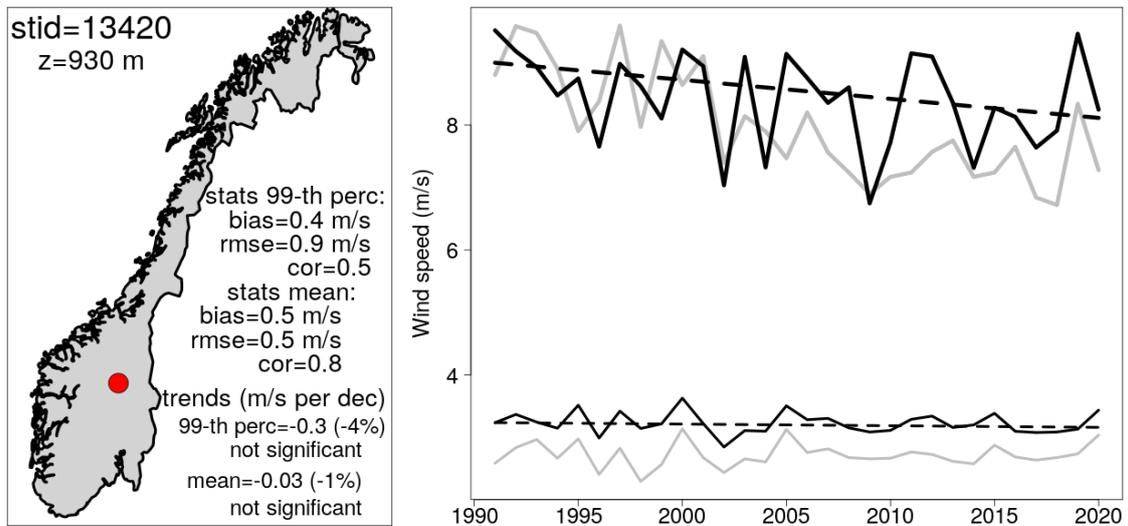


Figure 9: Venabu (station ID 13420). Time series of the annual averaged 10-metre wind speed (thin lines, gray for the observed, black for NORA3, dashed black is the Theil-Sen linear fitting) and the annual 99-th percentile of the daily averaged wind speed (thick lines, same meaning as the thin lines). The left panel shows the station location (red dot), the elevation (z), the slopes of the linear regressions ("99-th perc" and "mean"), with the corresponding p-values.

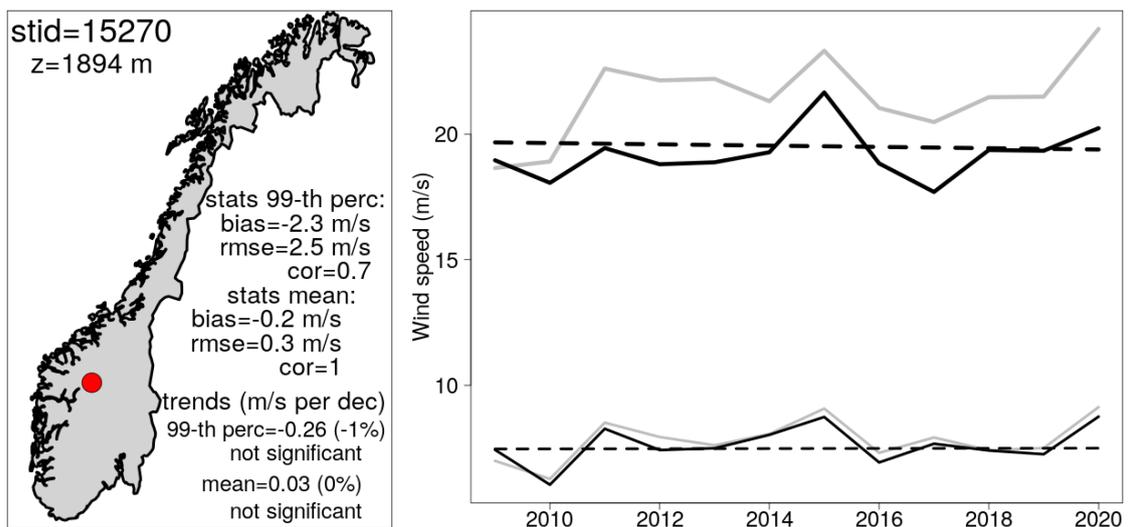


Figure 10: Juvvasshøe. Same layout as in Fig.63

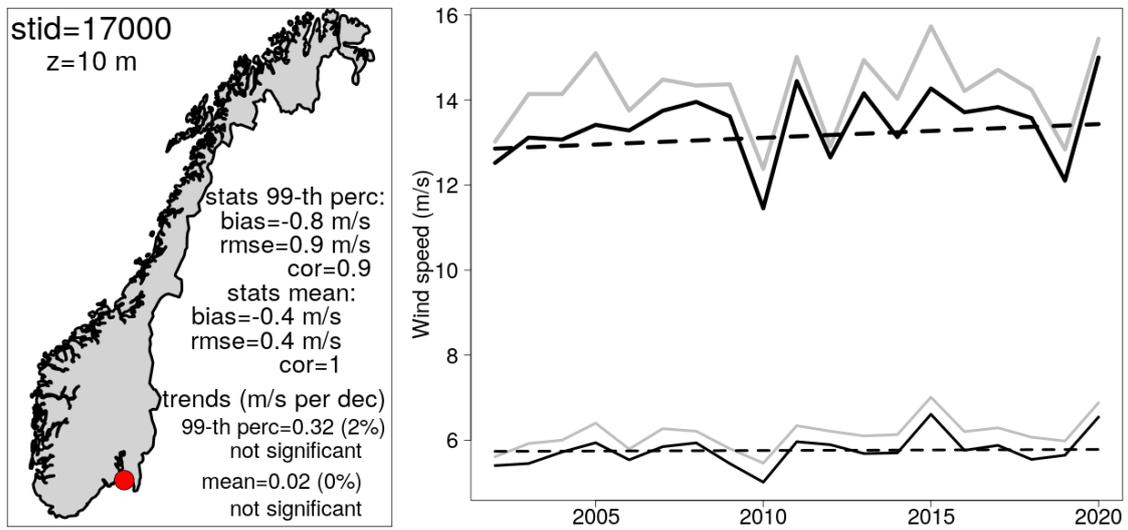


Figure 11: Strømtangen Fyr. Same layout as in Fig.63

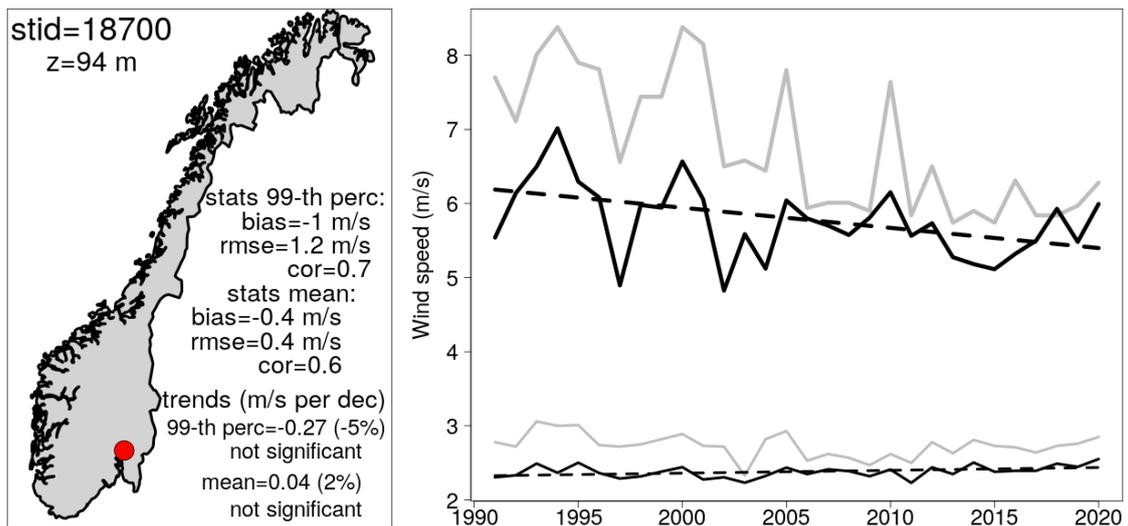


Figure 12: Oslo. Same layout as in Fig.63

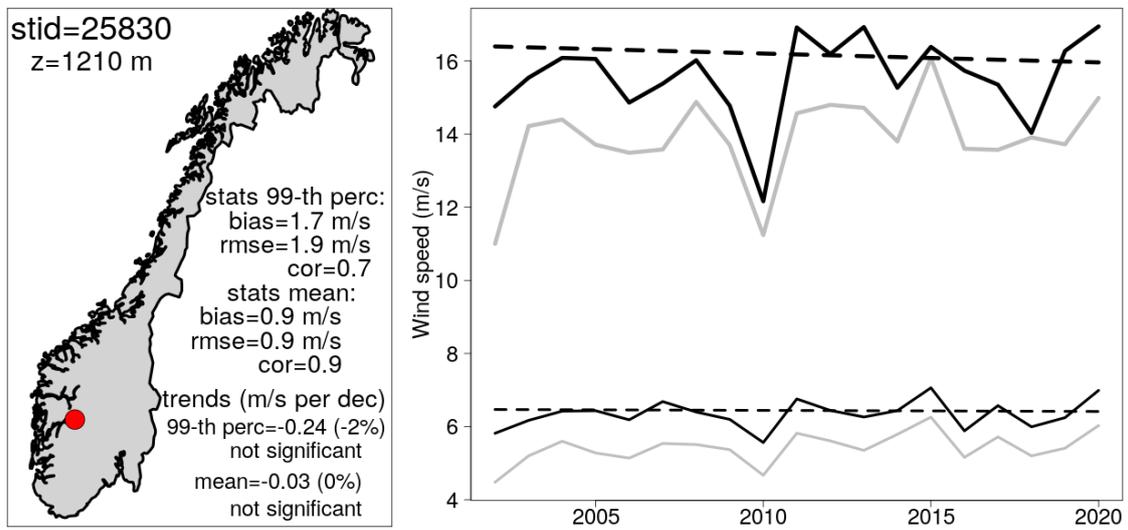


Figure 13: Finsevåtn. Same layout as in Fig.63

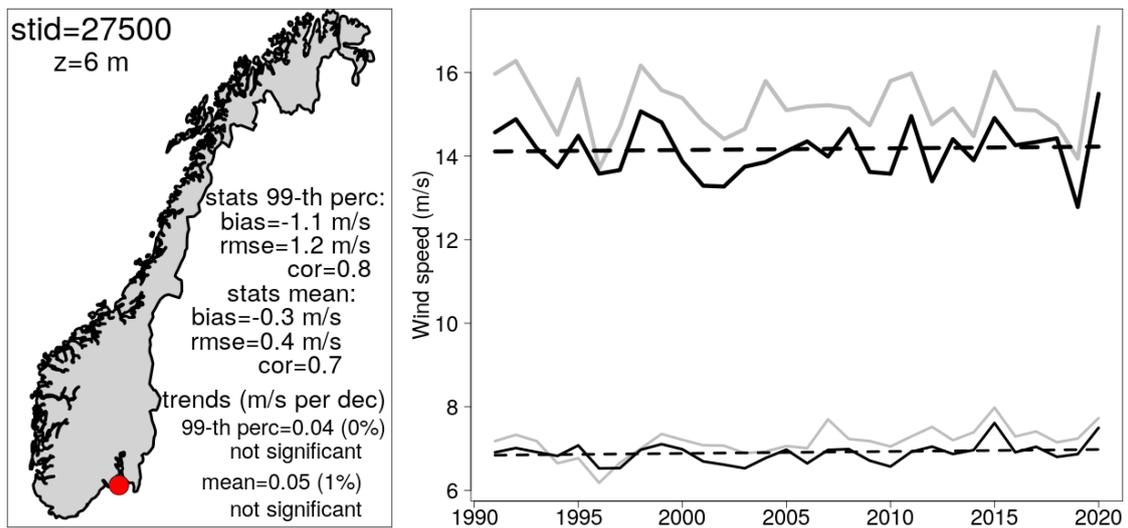


Figure 14: Færder Fyr. Same layout as in Fig.63

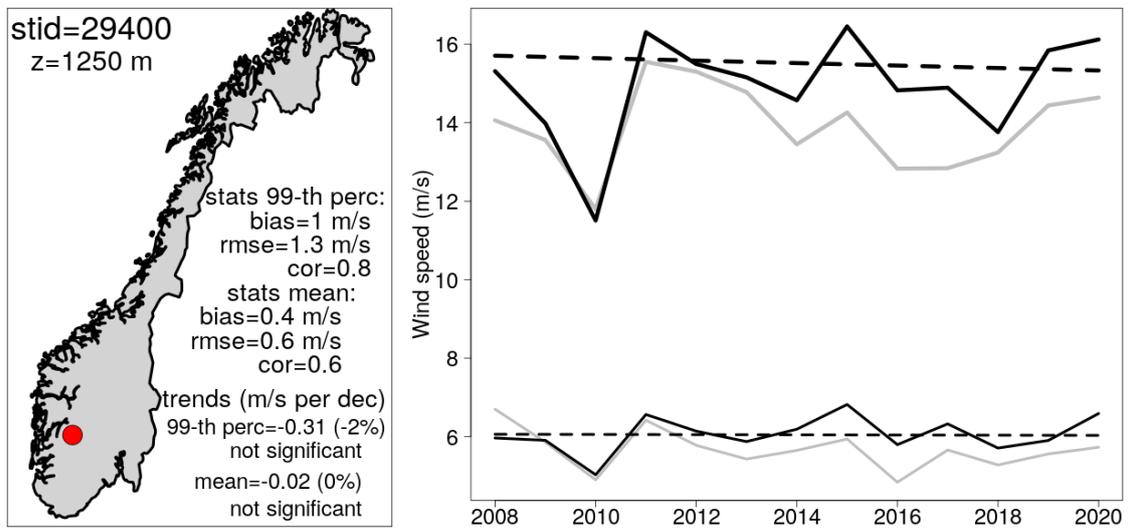


Figure 15: Sandhaug. Same layout as in Fig.63

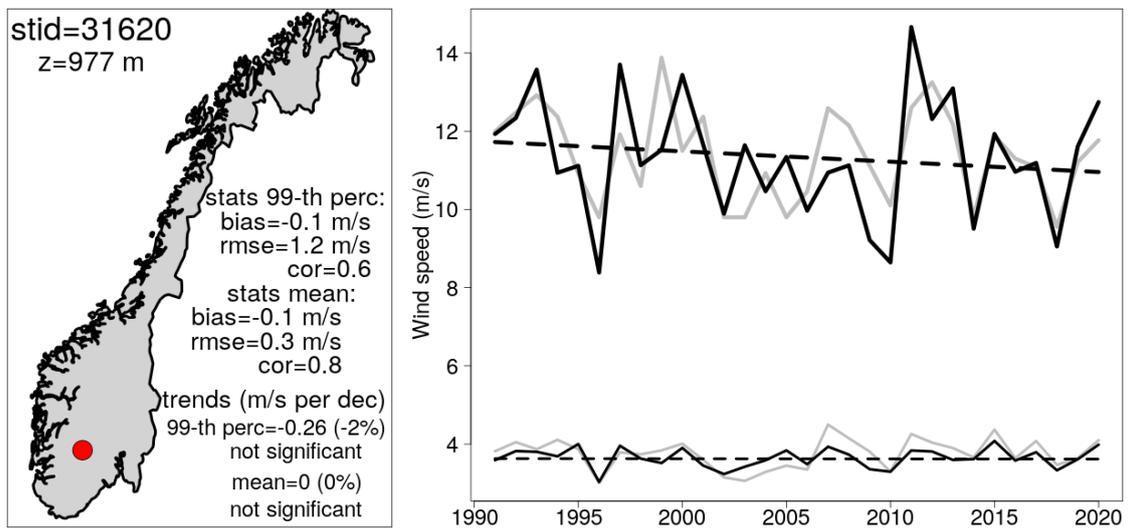


Figure 16: Møsstrand. Same layout as in Fig.63

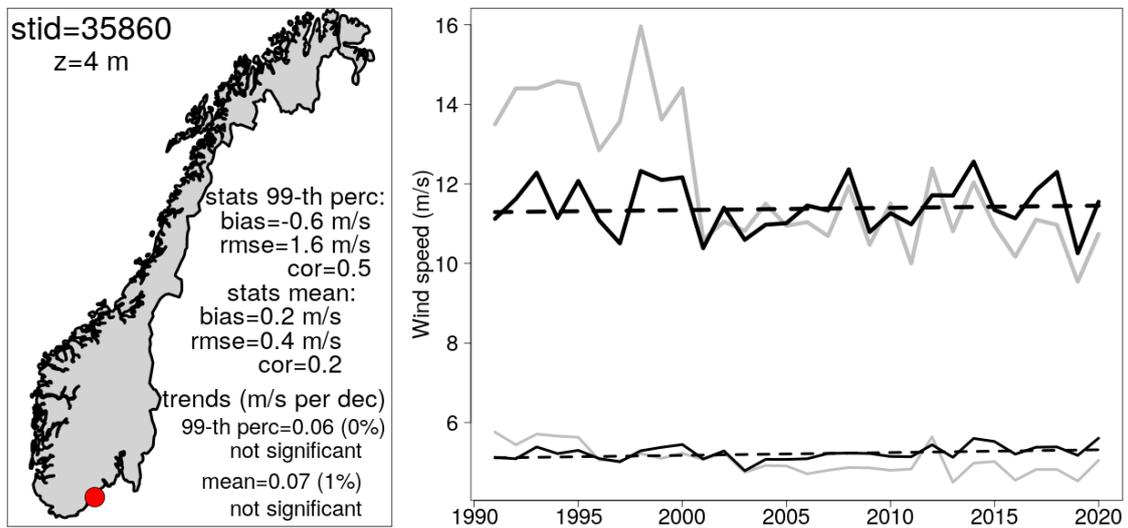


Figure 17: Lyngør Fyr. Same layout as in Fig.63

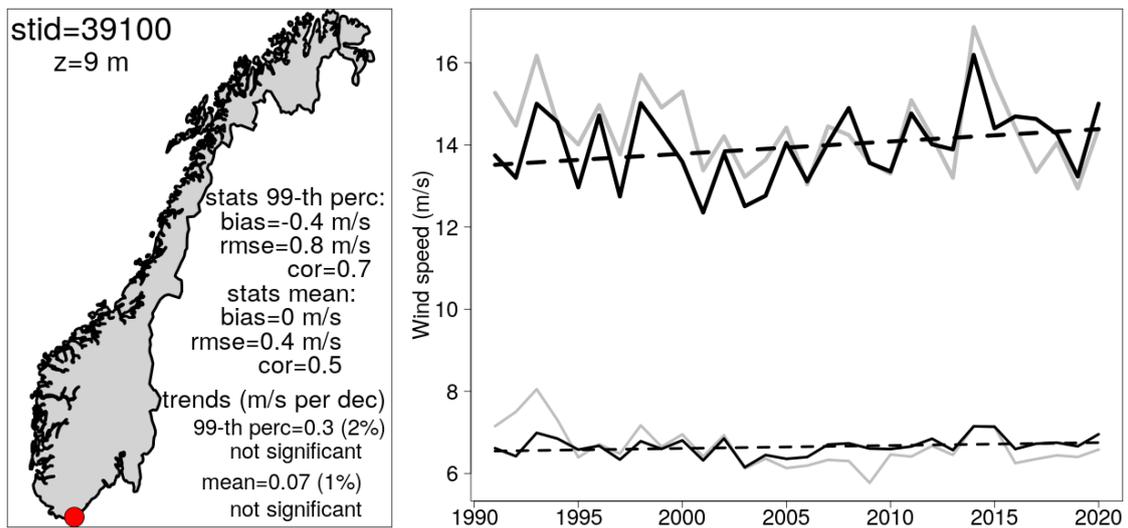


Figure 18: Oksøy Fyr. Same layout as in Fig.63

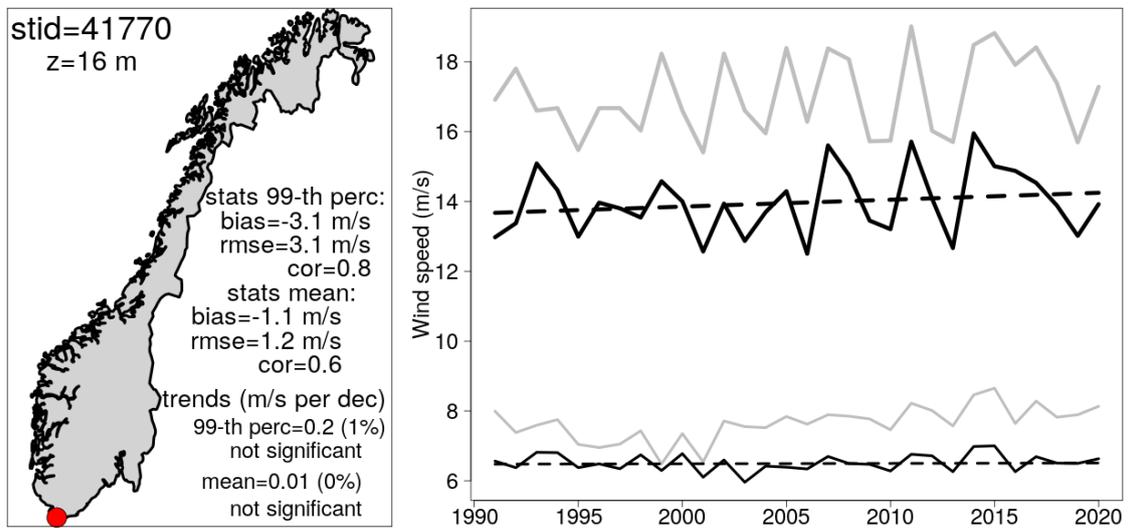


Figure 19: Lindesnes Fyr. Same layout as in Fig.63

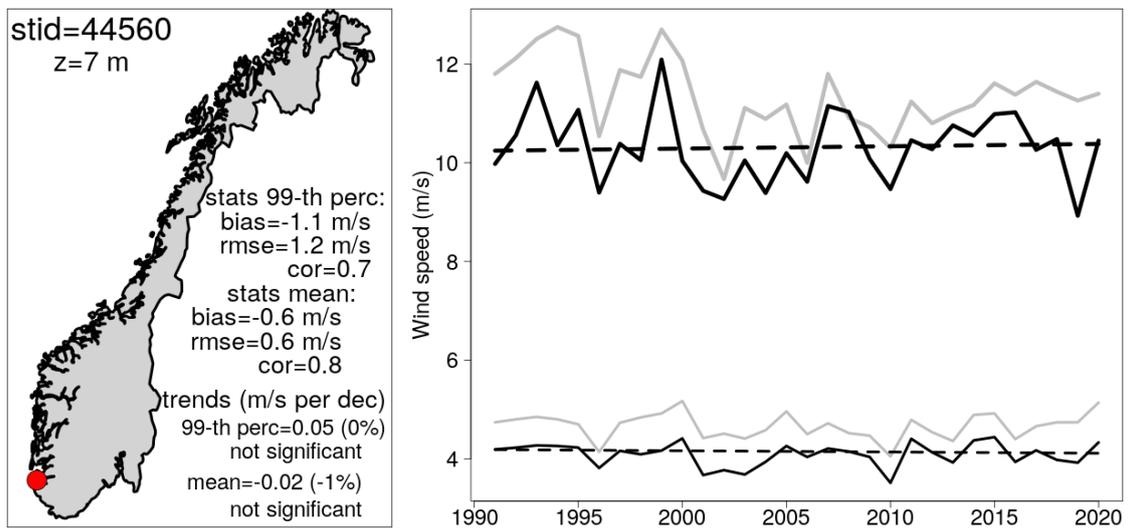


Figure 20: Sola-Stavanger. Same layout as in Fig.63

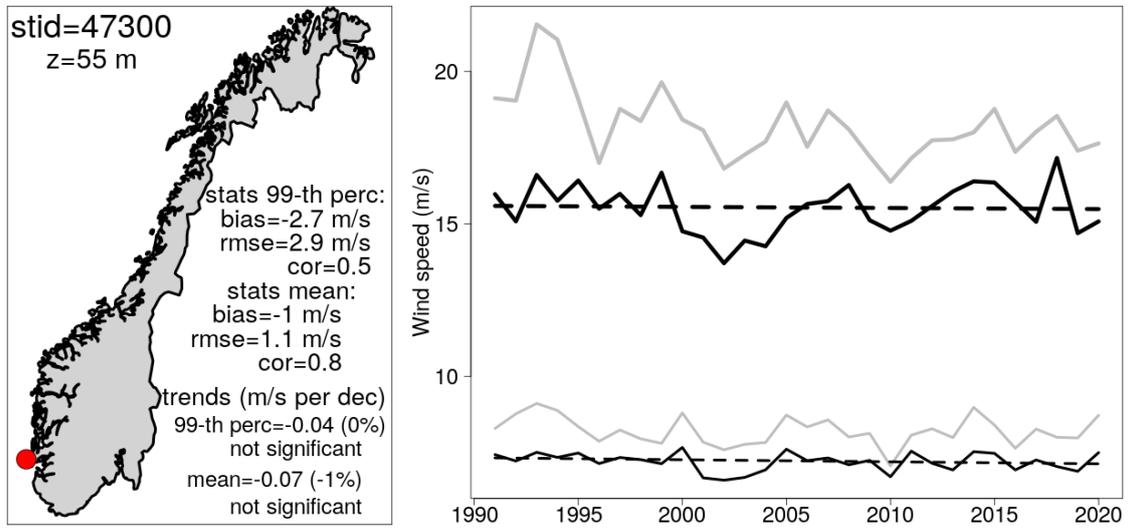


Figure 21: Utsira Fyr. Same layout as in Fig.63

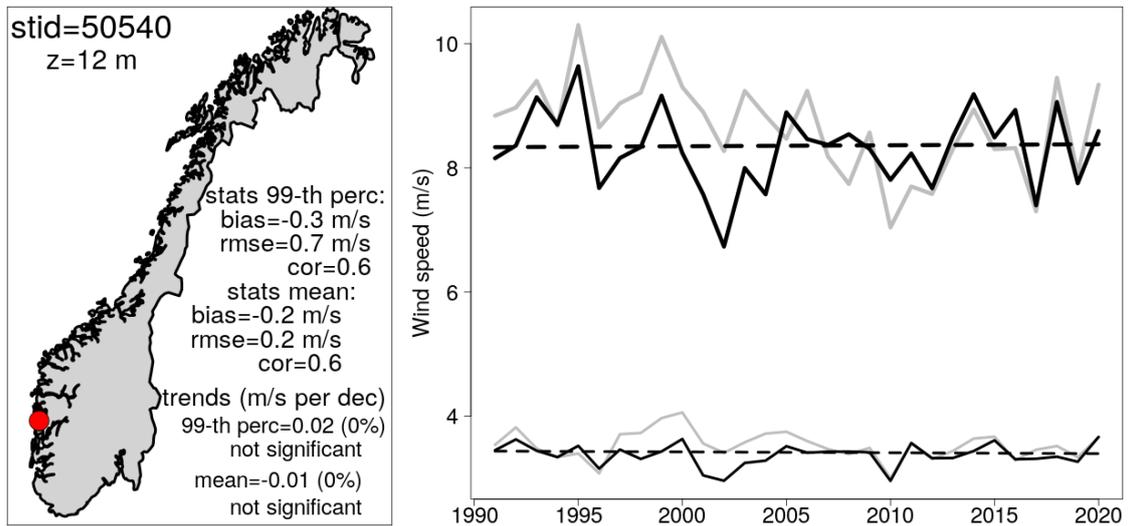


Figure 22: Bergen (Florida). Same layout as in Fig.63

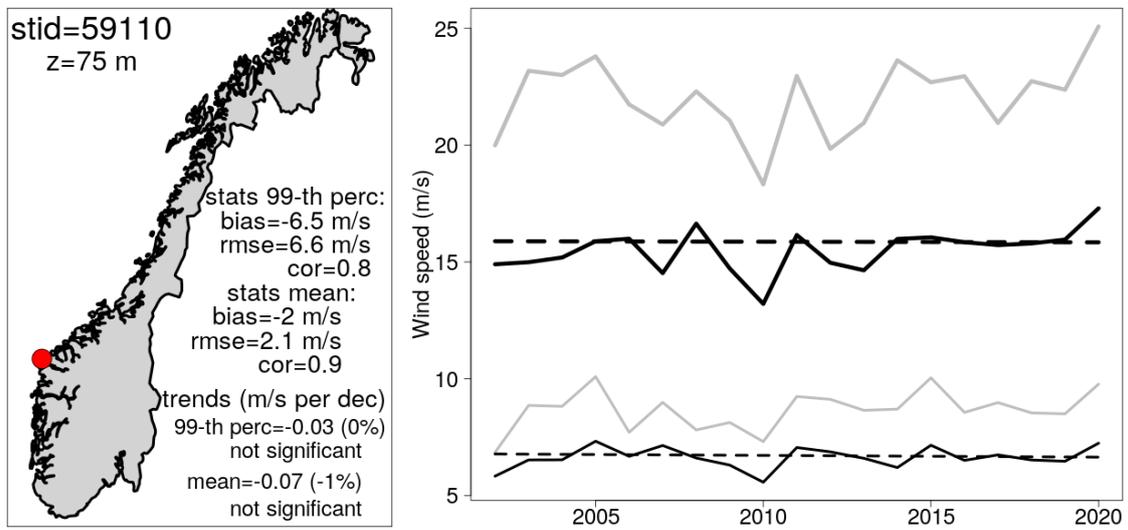


Figure 23: Kråkenes. Same layout as in Fig.63

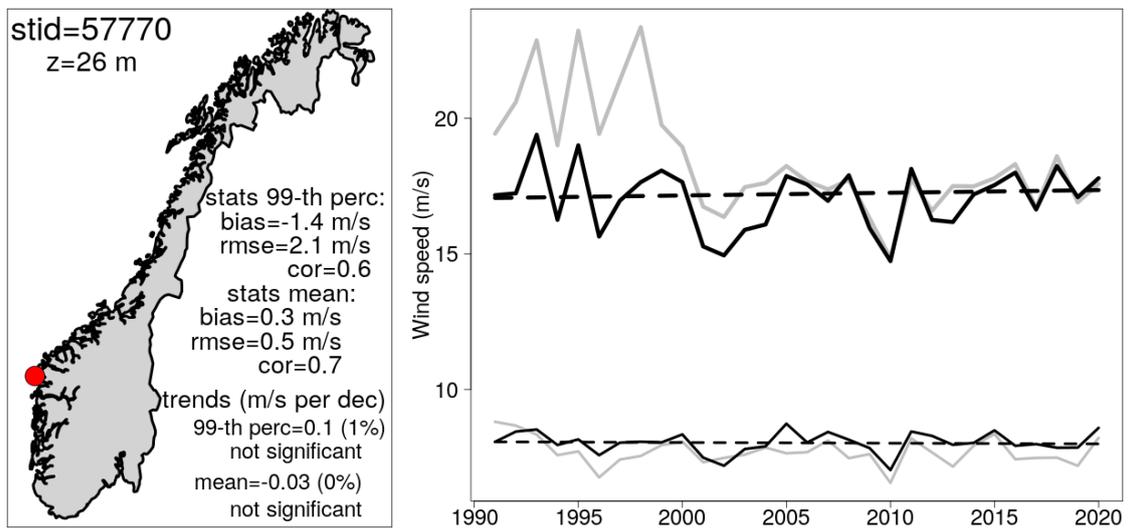


Figure 24: Ytterøyane. Same layout as in Fig.63

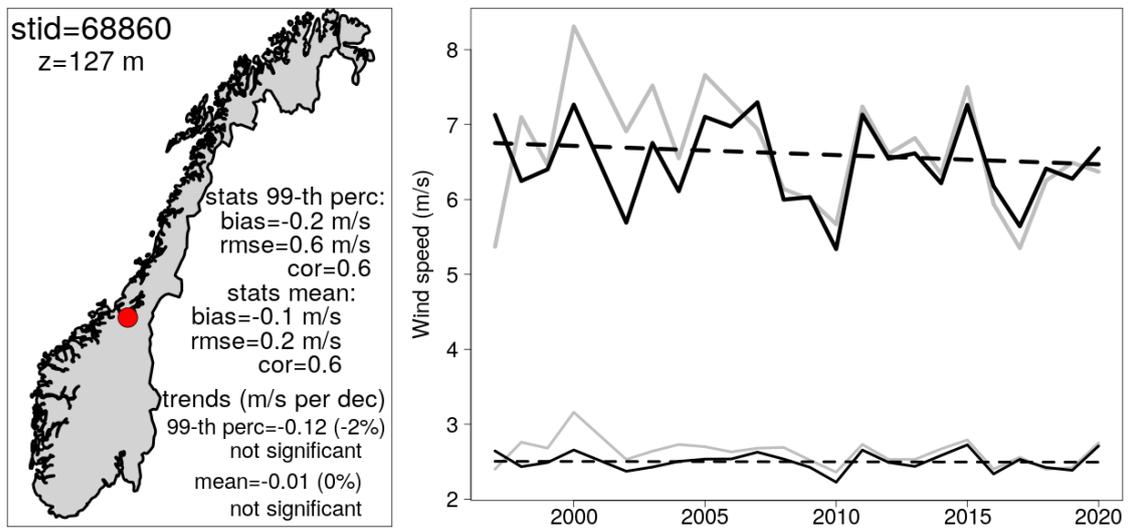


Figure 25: Trondheim. Same layout as in Fig.63

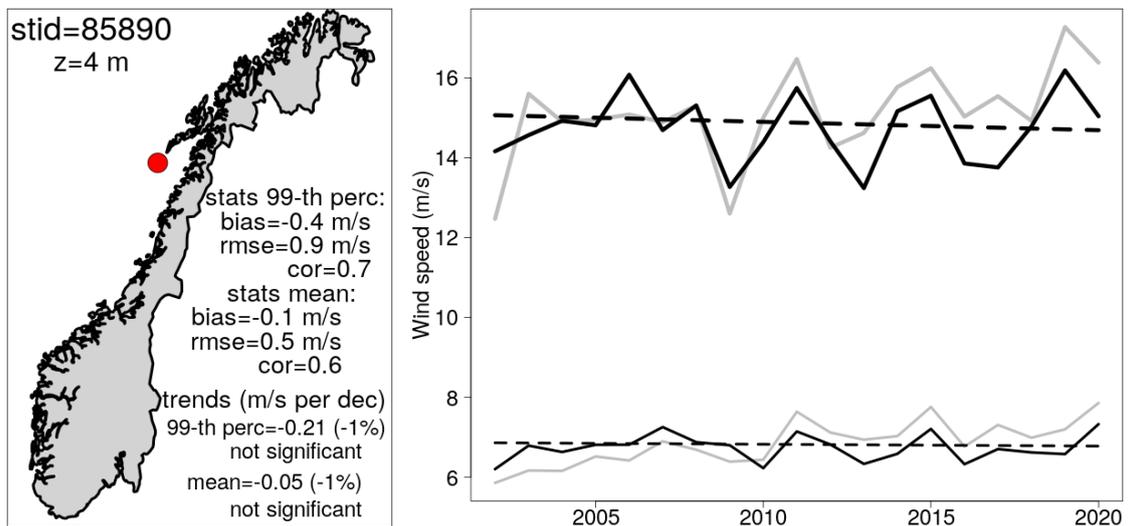


Figure 26: Røst lufthavn. Same layout as in Fig.63

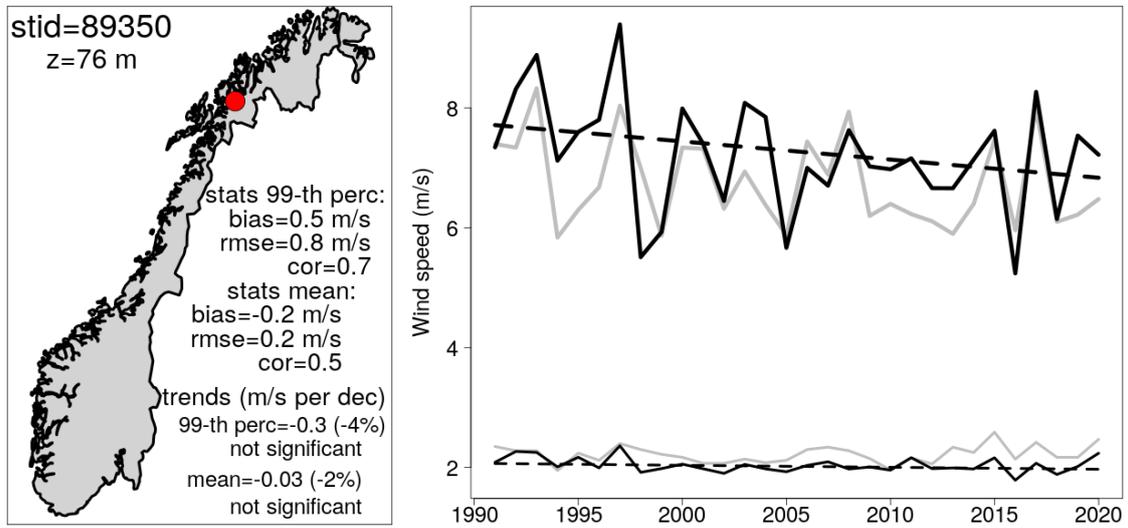


Figure 27: Bardufoss. Same layout as in Fig.63

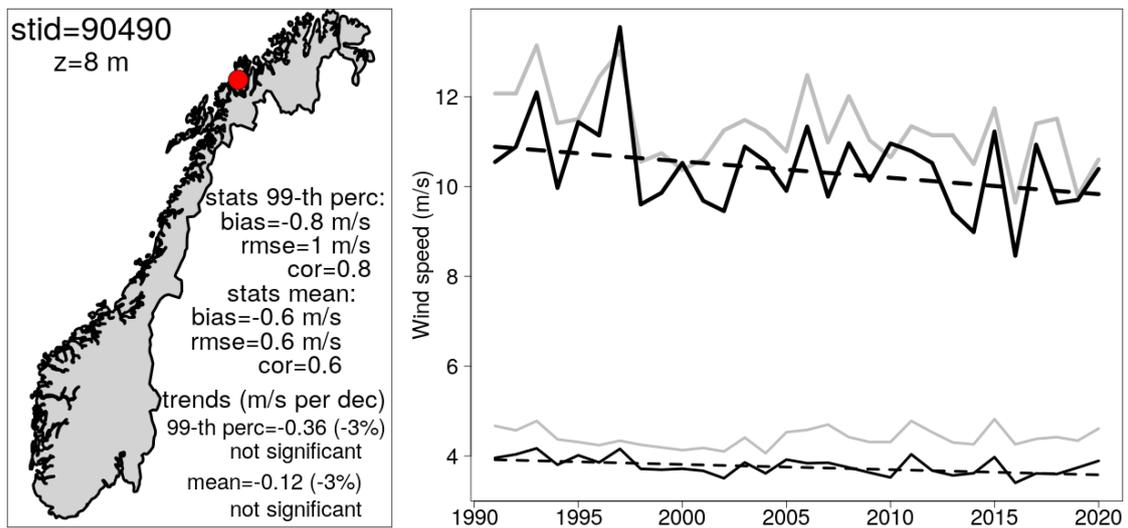


Figure 28: Tromsø. Same layout as in Fig.63

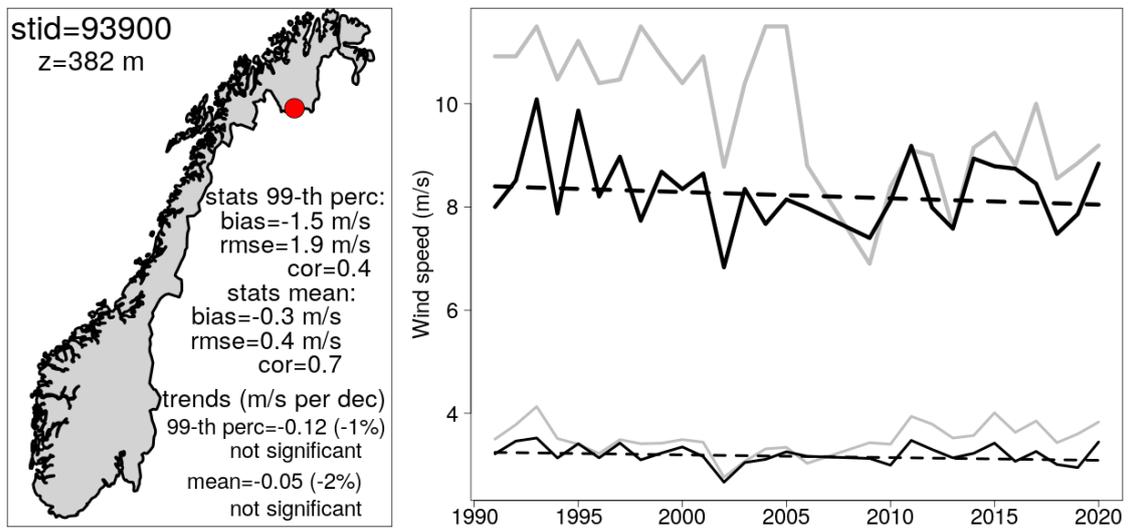


Figure 29: Sihccajauri. Same layout as in Fig.63

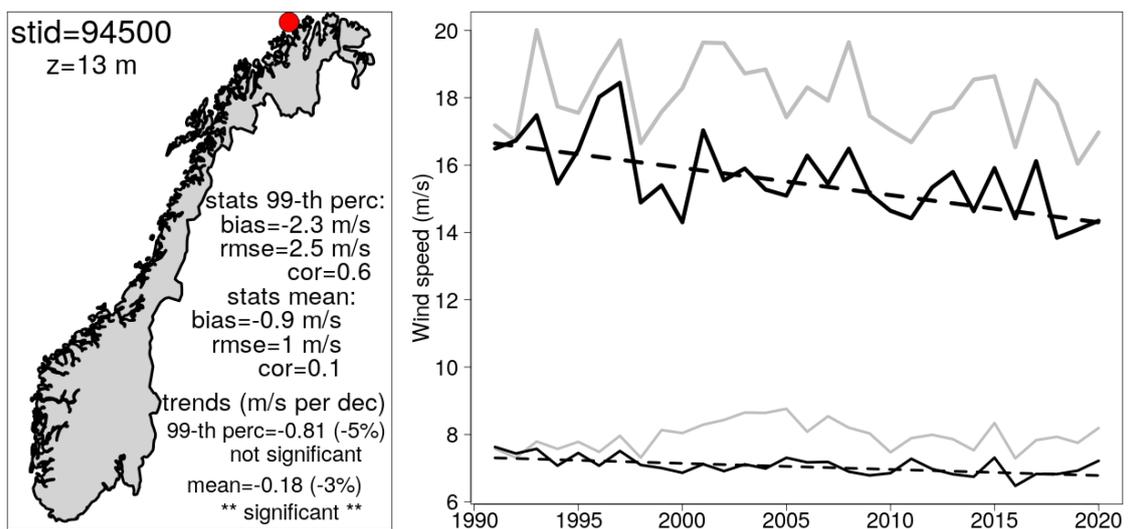


Figure 30: Fruholmen Fyr. Same layout as in Fig.63

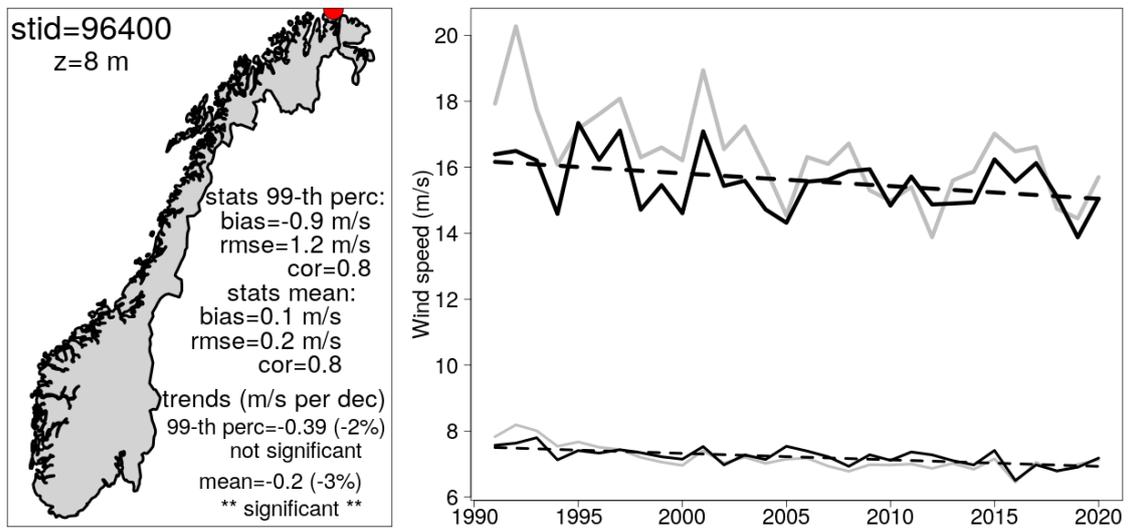


Figure 31: Slettnes Fyr. Same layout as in Fig.63

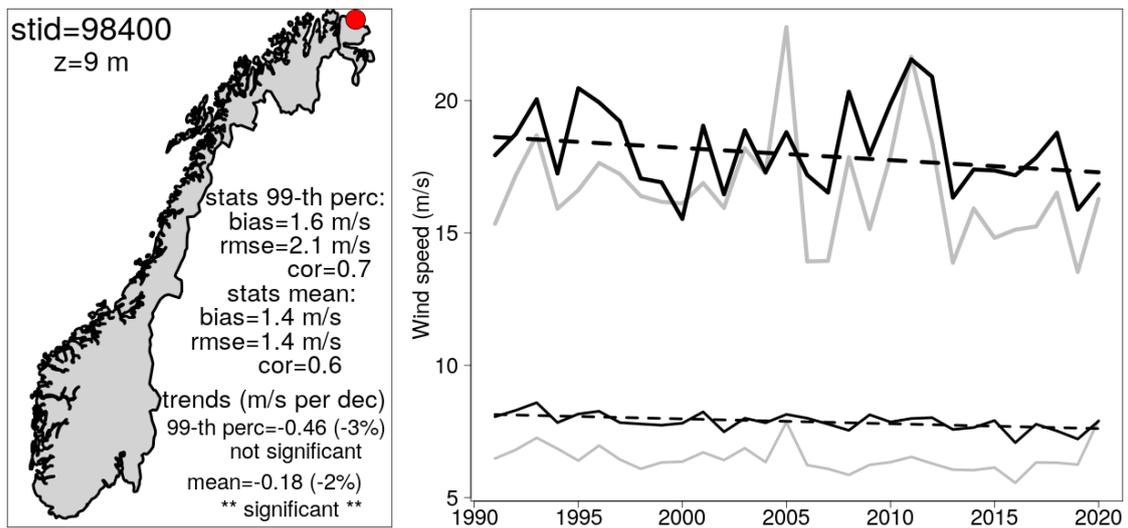


Figure 32: Makkaur Fyr. Same layout as in Fig.63

3.2 Monthly aggregated variables

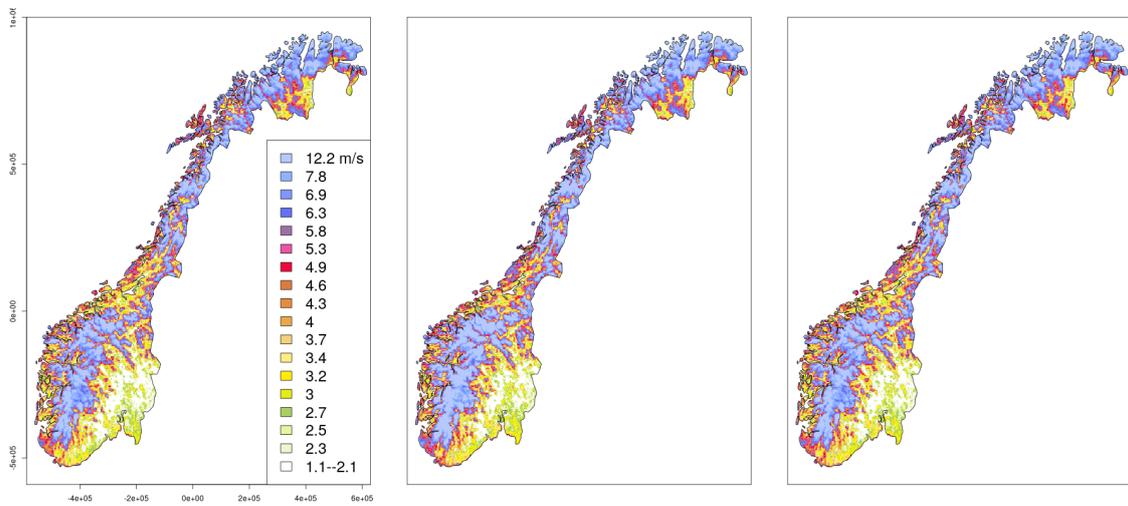


Figure 33: Average 10-metre wind speed 1991–2020 monthly normals. Winter months (left to right): December, January, February.

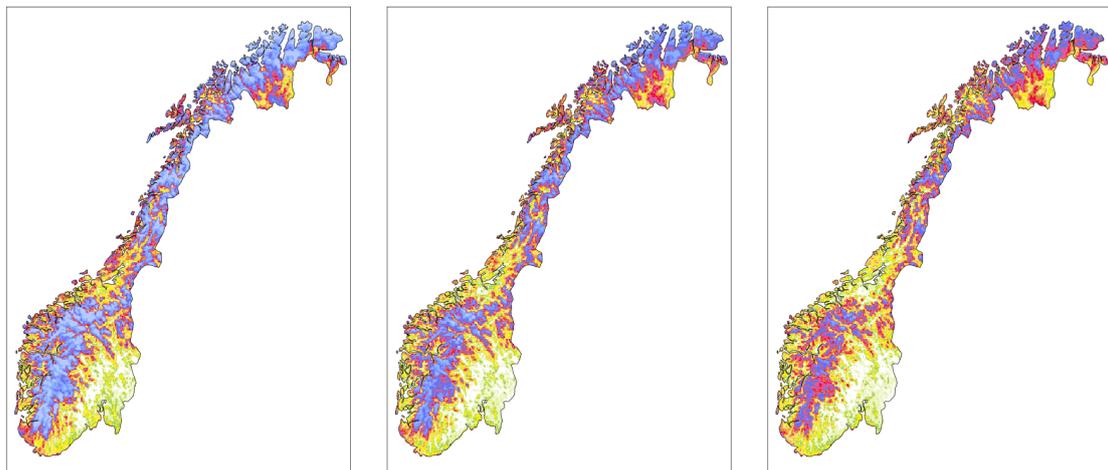


Figure 34: Average 10-metre wind speed 1991–2020 monthly normals. Spring months (left to right): March, April, May. The color scale is the same as for Fig. 33.

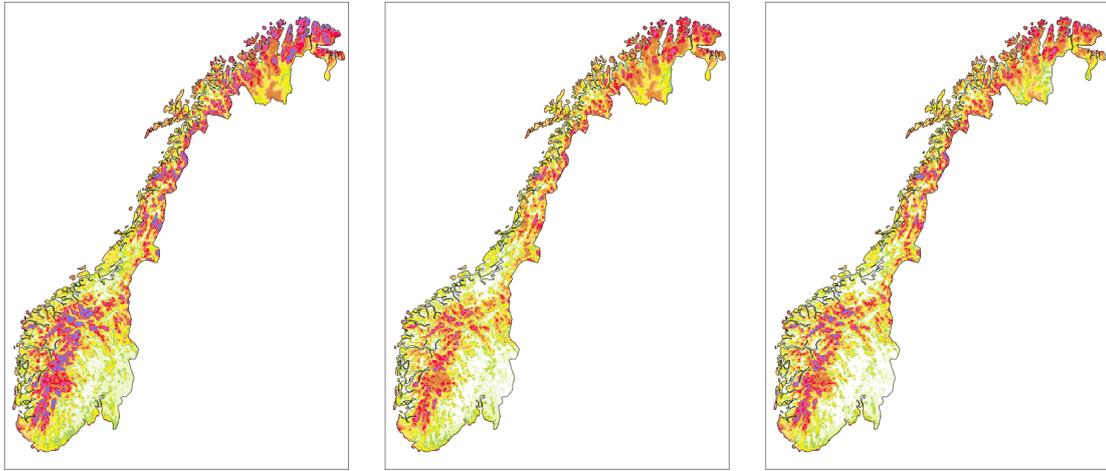


Figure 35: Average 10–metre wind speed 1991–2020 monthly normals. Summer months (left to right): June, July, August. The color scale is the same as for Fig. 33.

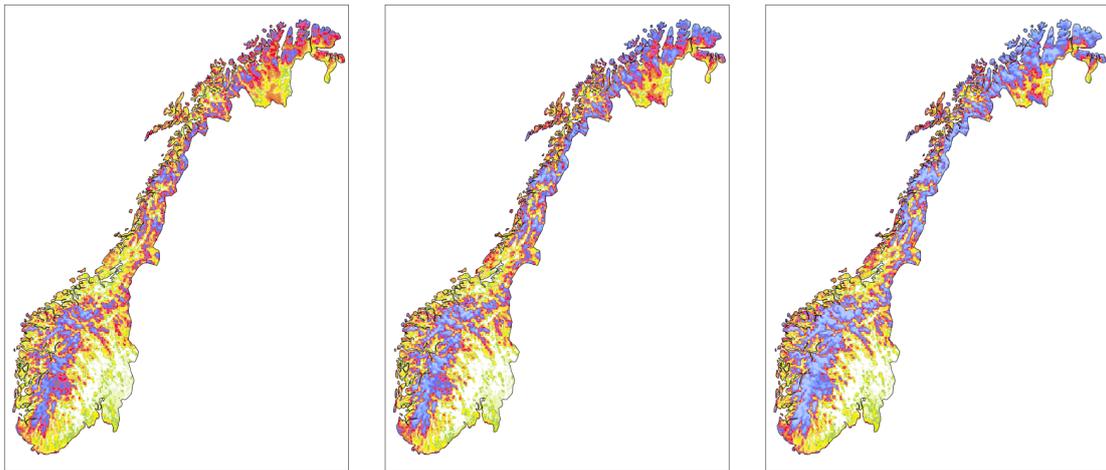


Figure 36: Average 10–metre wind speed 1991–2020 monthly normals. Autumn months (left to right): September, October, November. The color scale is the same as for Fig. 33.

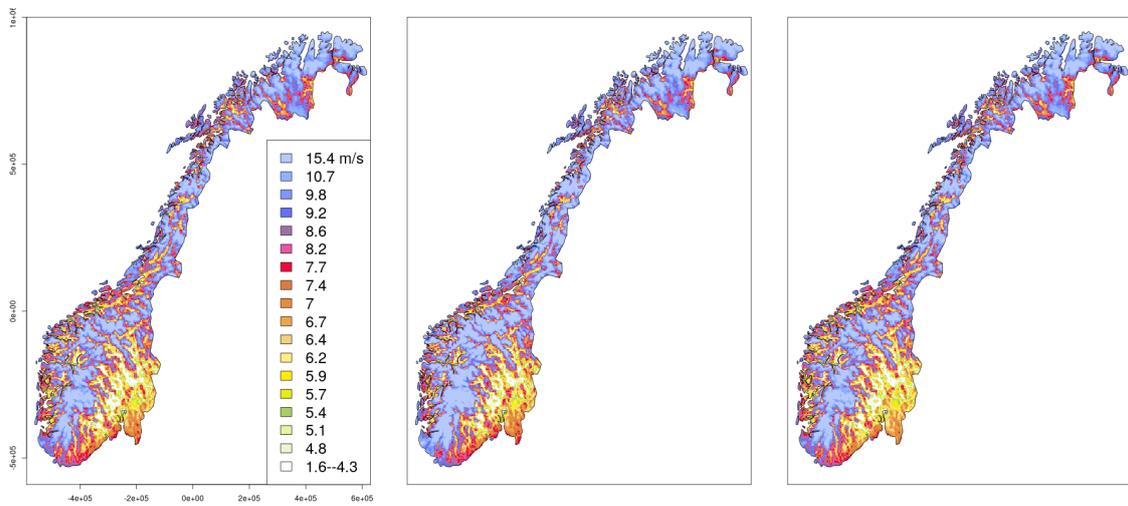


Figure 37: Average 100–metre wind speed 1991–2020 monthly normals. Winter months (left to right): December, January, February.

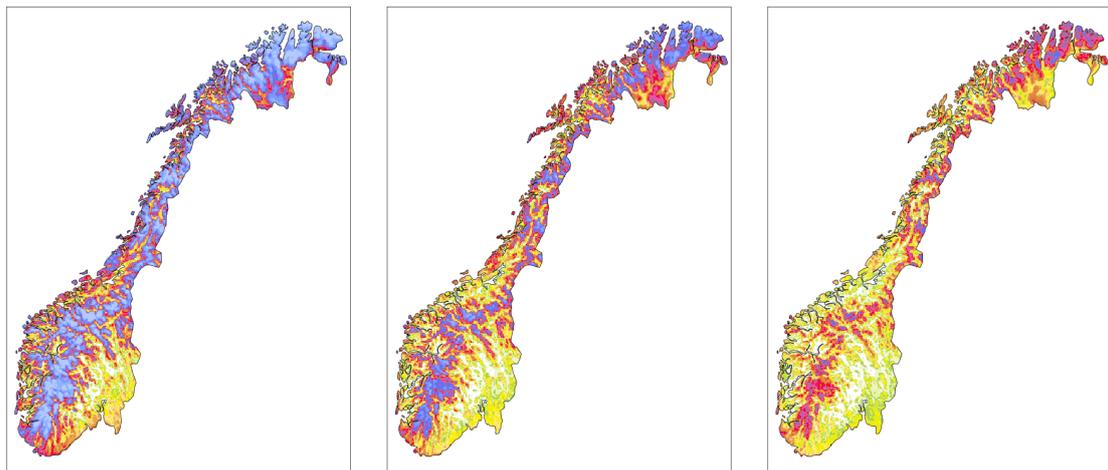


Figure 38: Average 100–metre wind speed 1991–2020 monthly normals. Spring months (left to right): March, April, May. The color scale is the same as for Fig. 37.

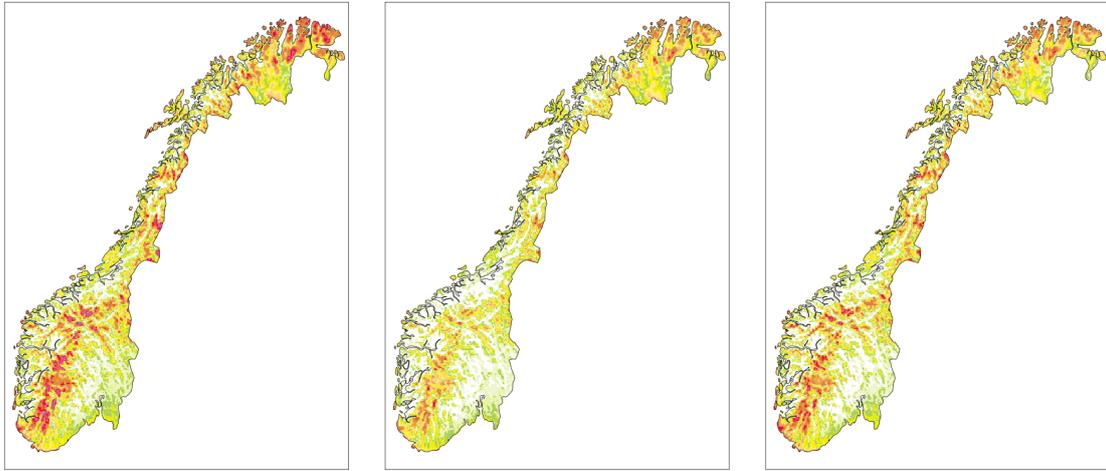


Figure 39: Average 100–metre wind speed 1991–2020 monthly normals. Summer months (left to right): June, July, August. The color scale is the same as for Fig. 37.

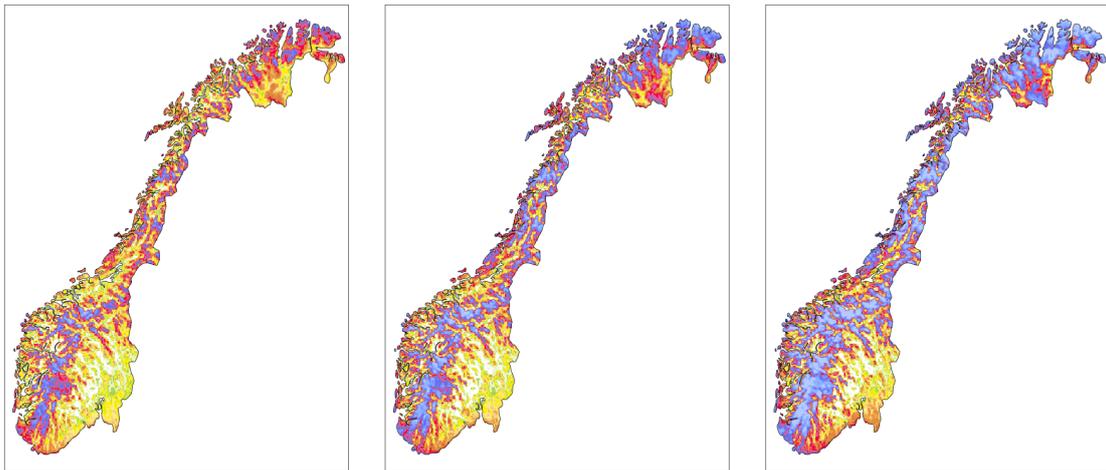


Figure 40: Average 100–metre wind speed 1991–2020 monthly normals. Autumn months (left to right): September, October, November. The color scale is the same as for Fig. 37.

3.2.1 Temporal trends

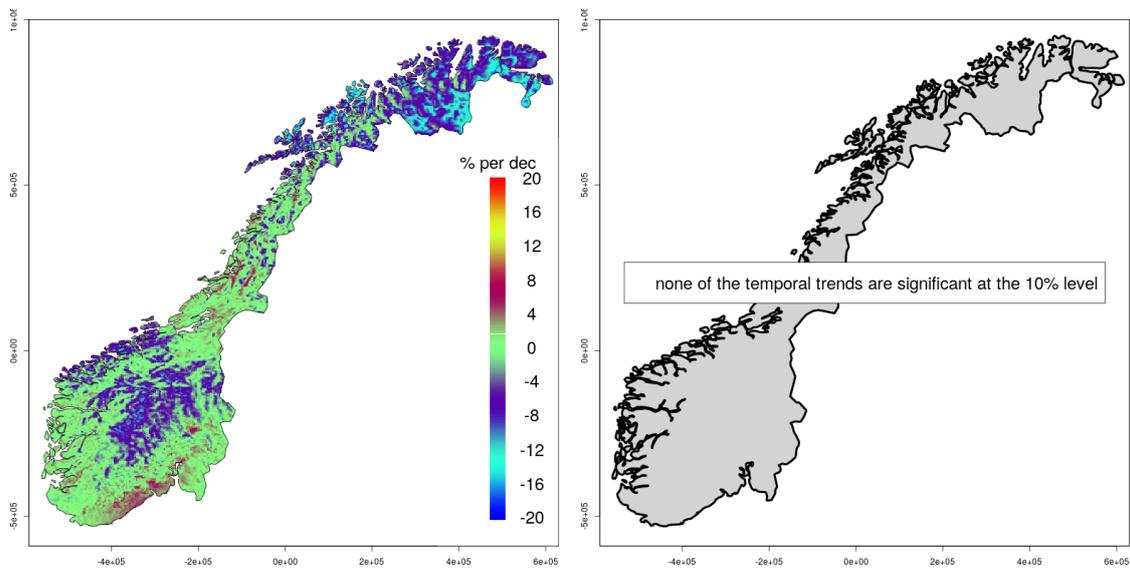


Figure 41: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of January over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

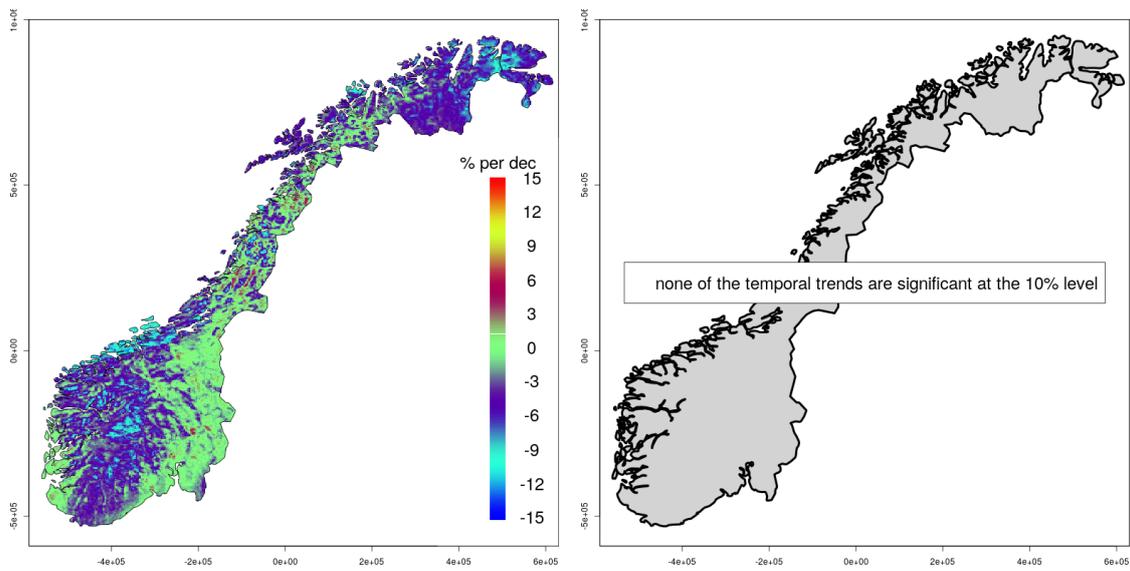


Figure 42: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of February over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

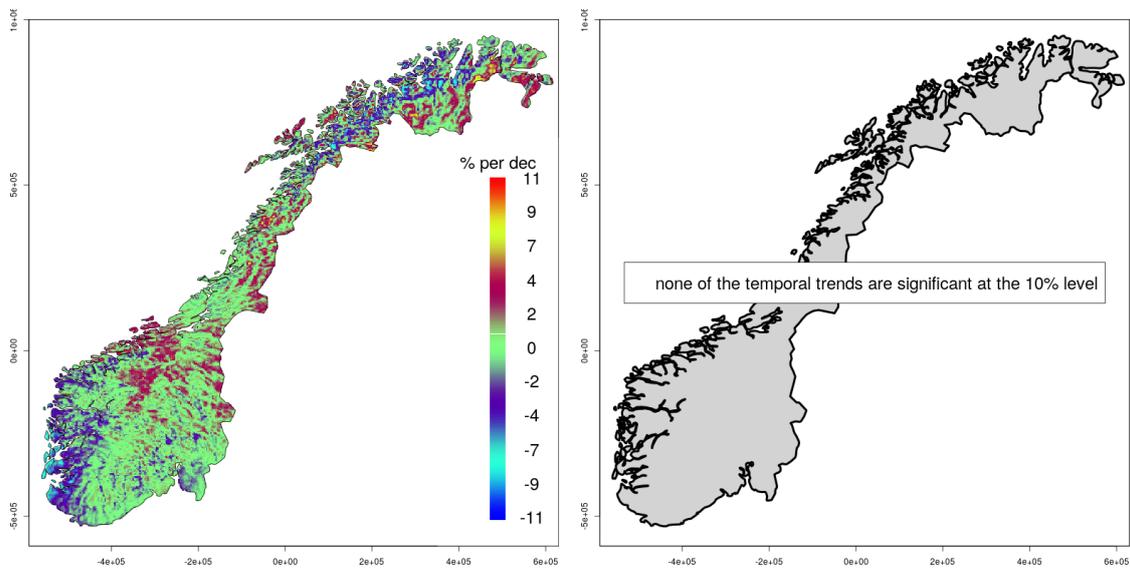


Figure 43: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of March over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

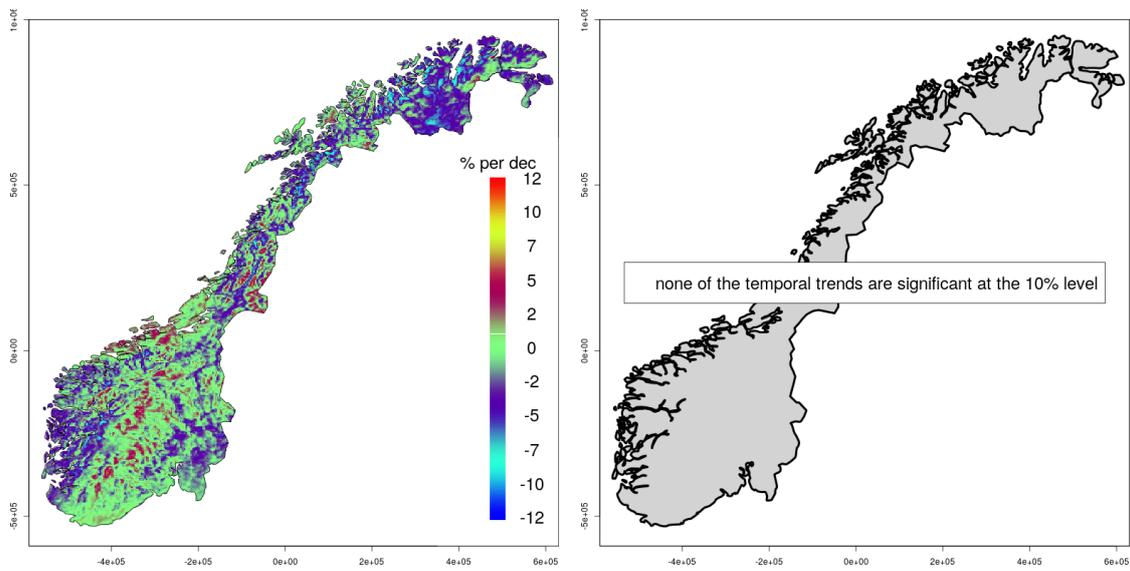


Figure 44: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of April over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

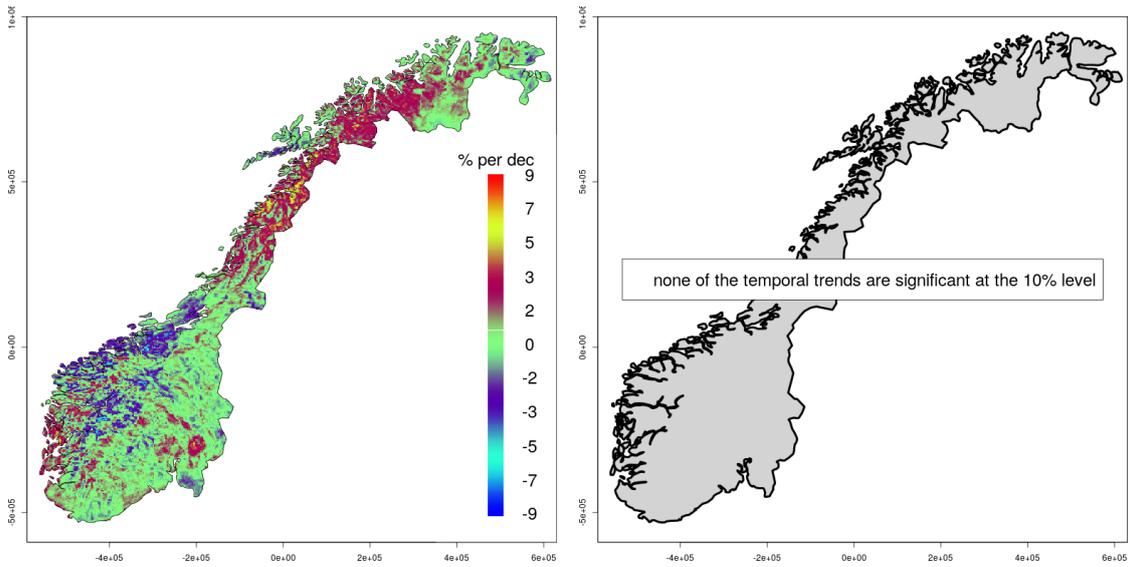


Figure 45: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of May over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

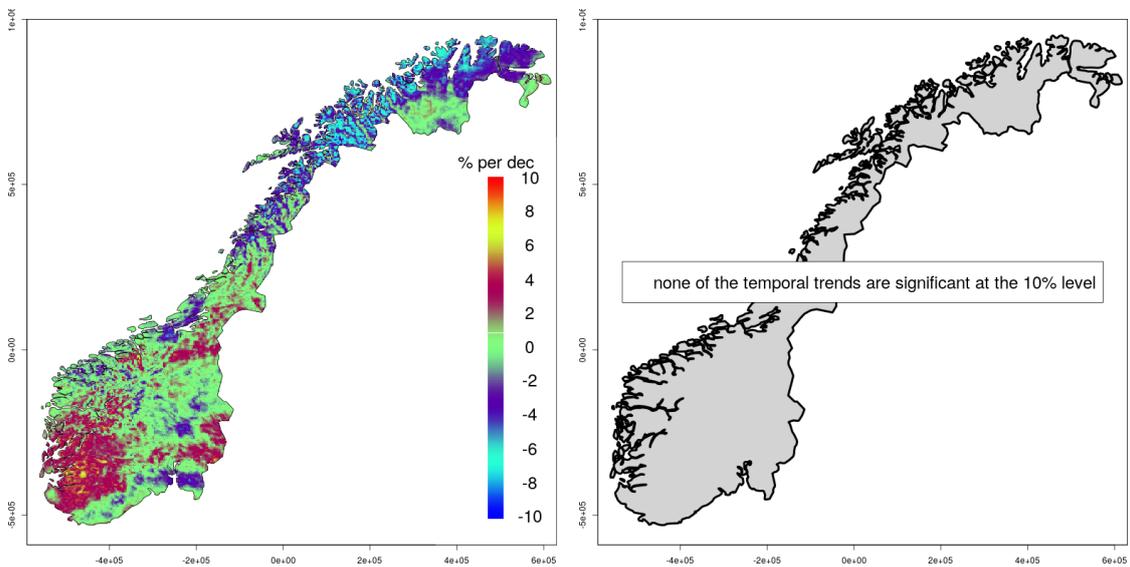


Figure 46: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of July over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

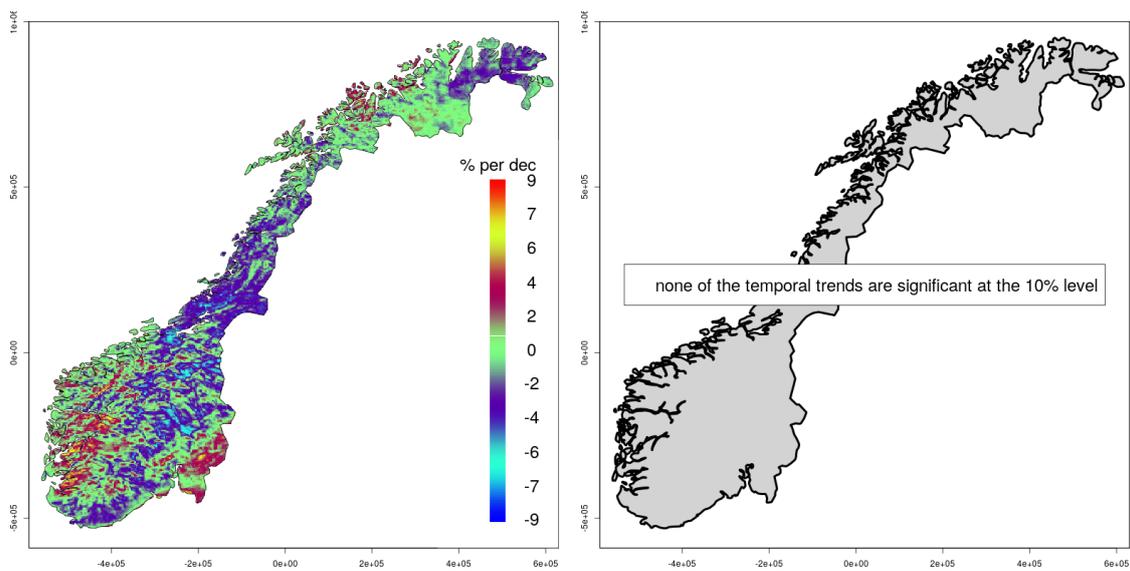


Figure 47: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of August over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

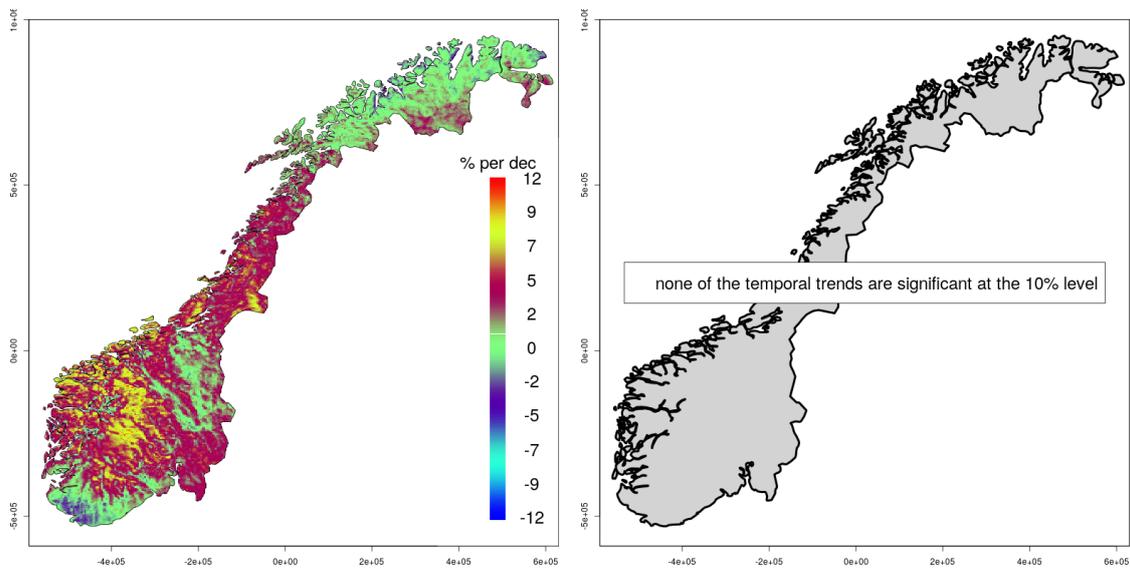


Figure 48: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of September over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

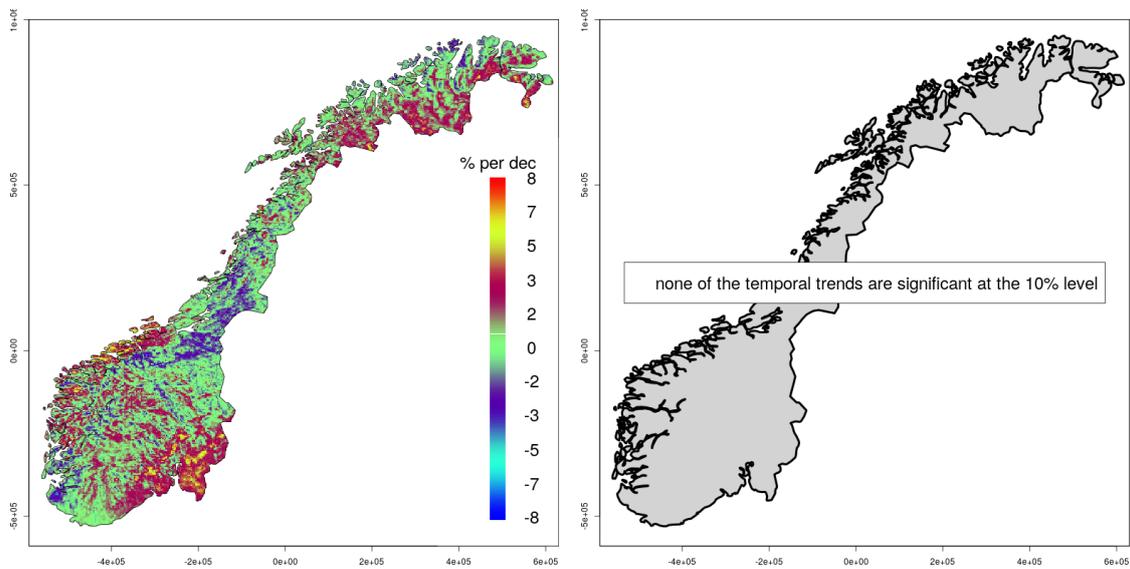


Figure 49: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of November over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

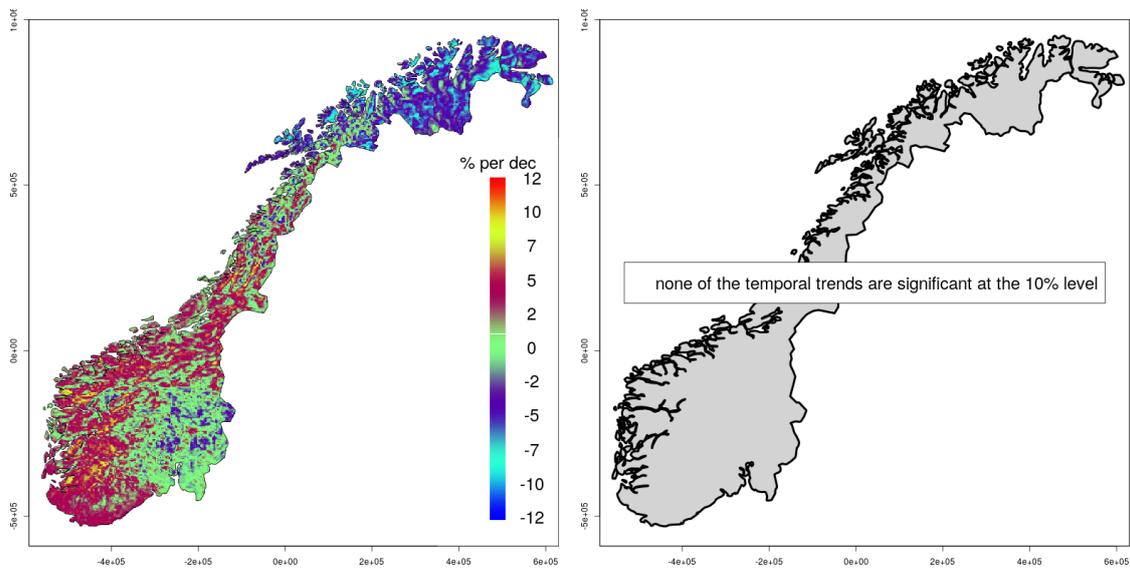


Figure 50: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of December over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

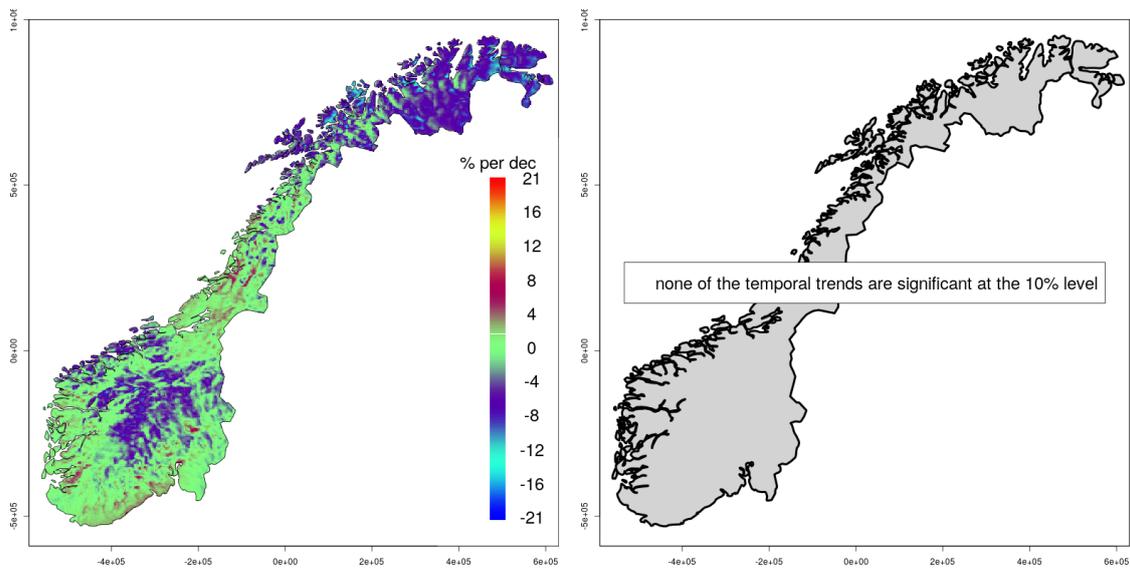


Figure 51: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of January over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

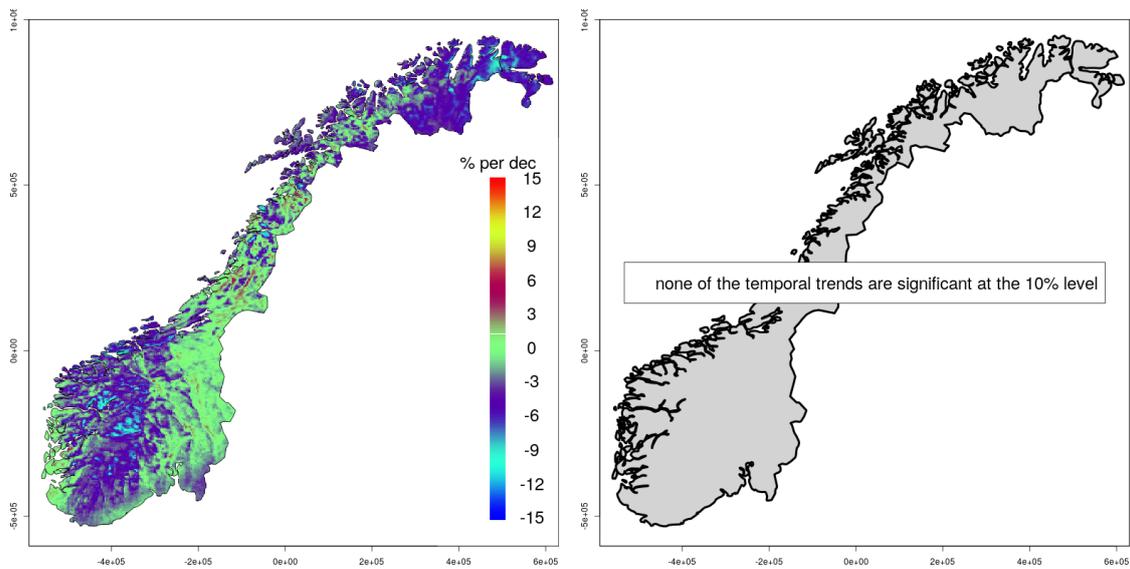


Figure 52: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of February over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

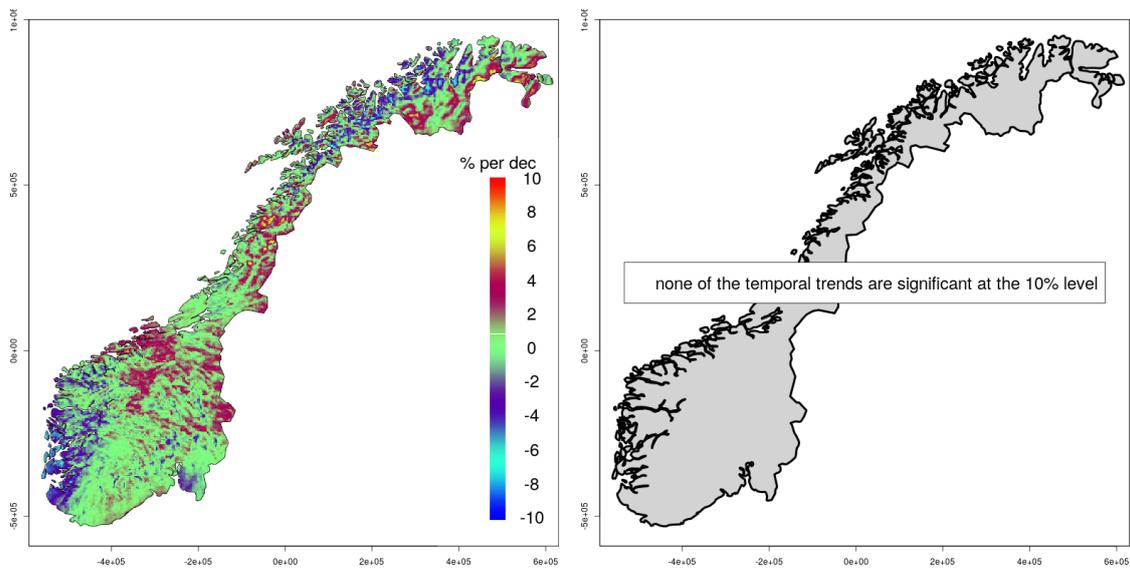


Figure 53: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of March over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

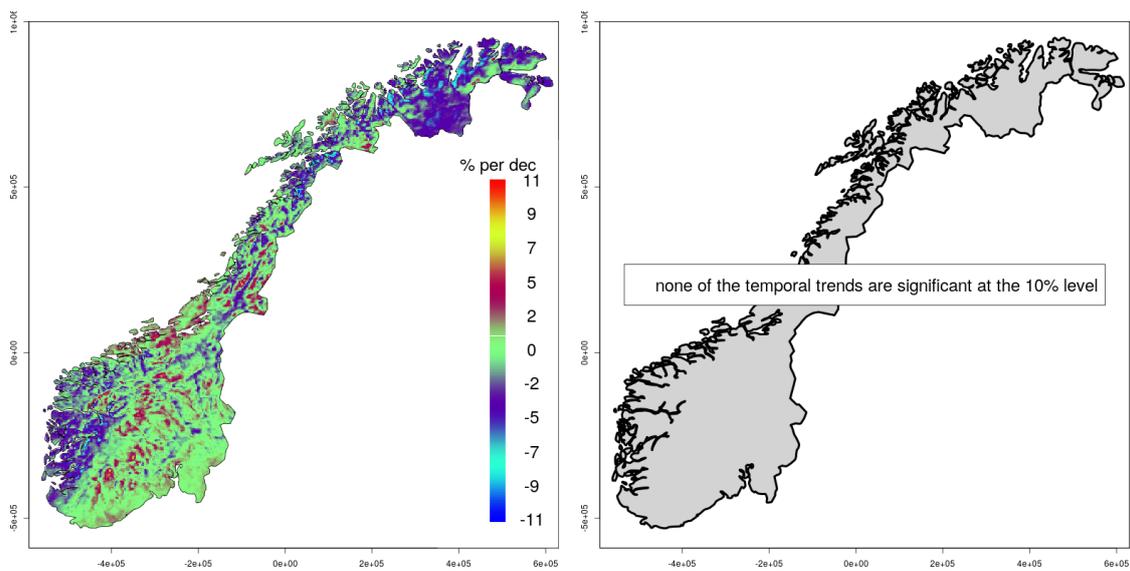


Figure 54: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of April over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

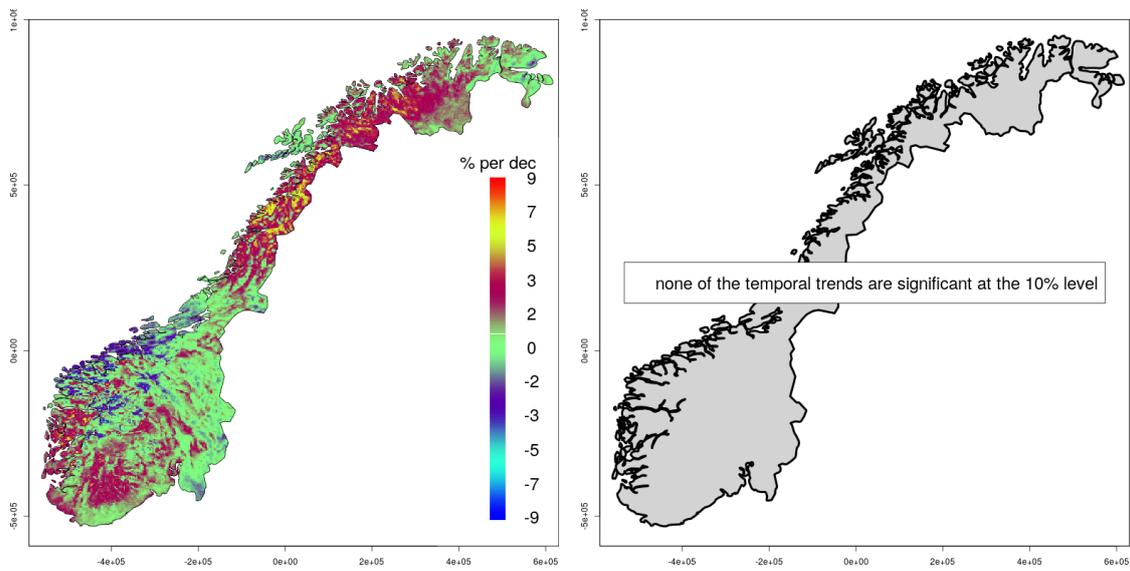


Figure 55: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of May over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

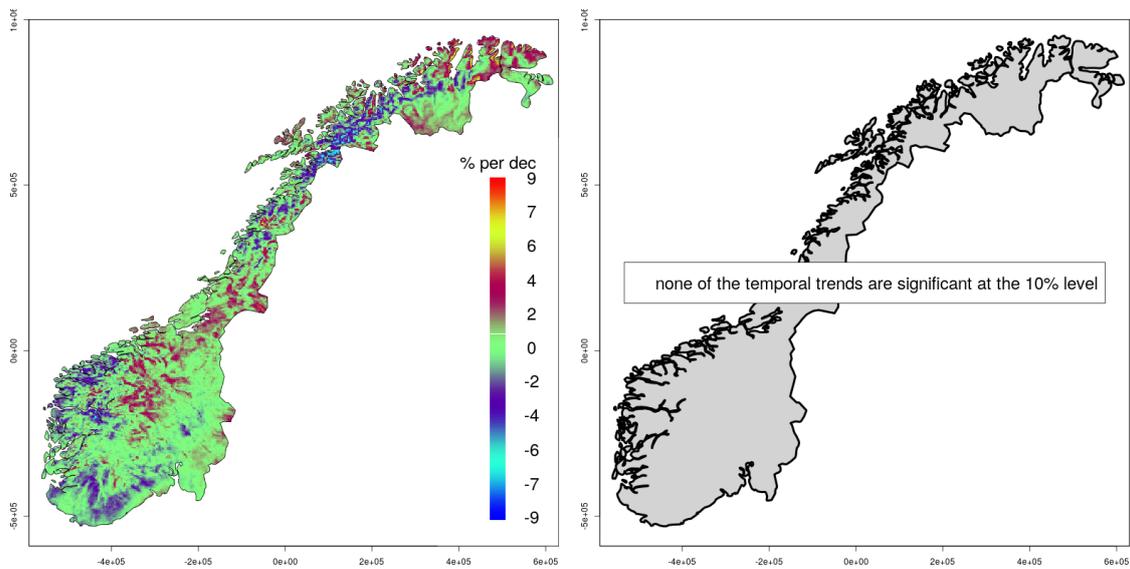


Figure 56: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of June over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

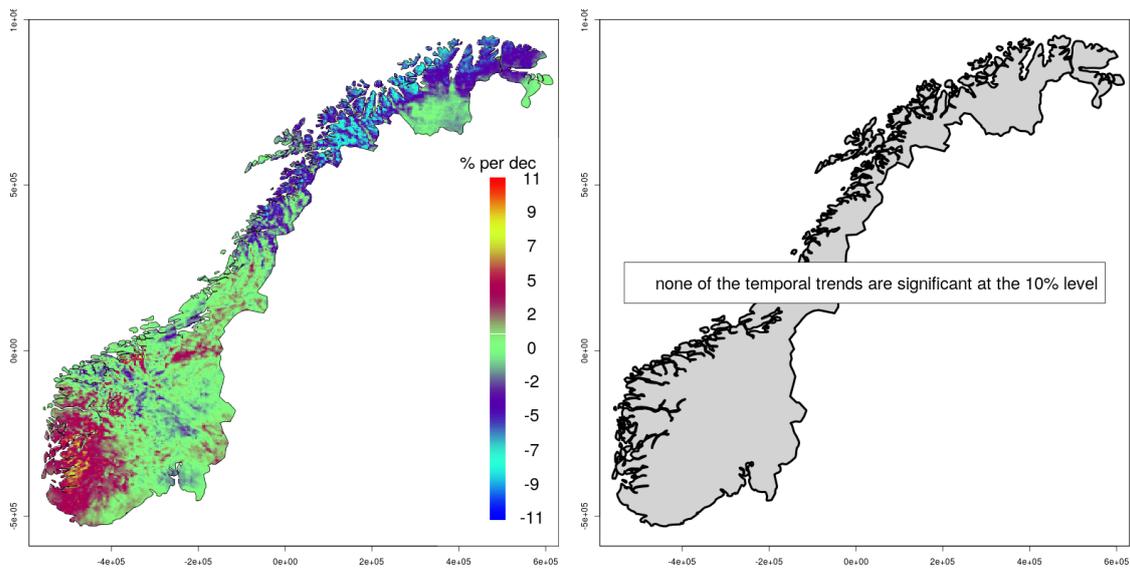


Figure 57: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of July over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

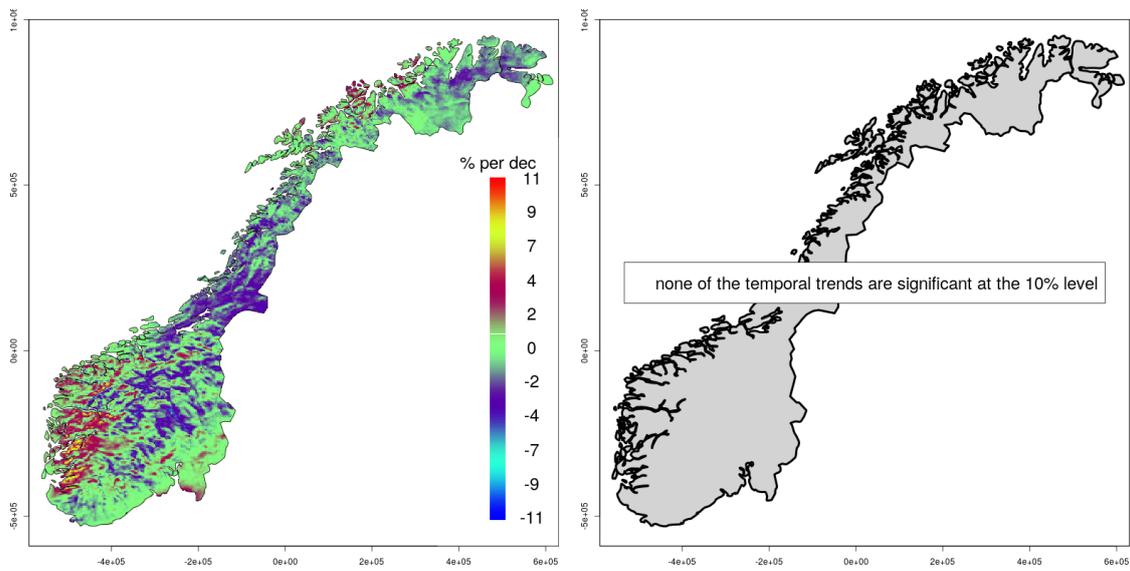


Figure 58: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of August over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

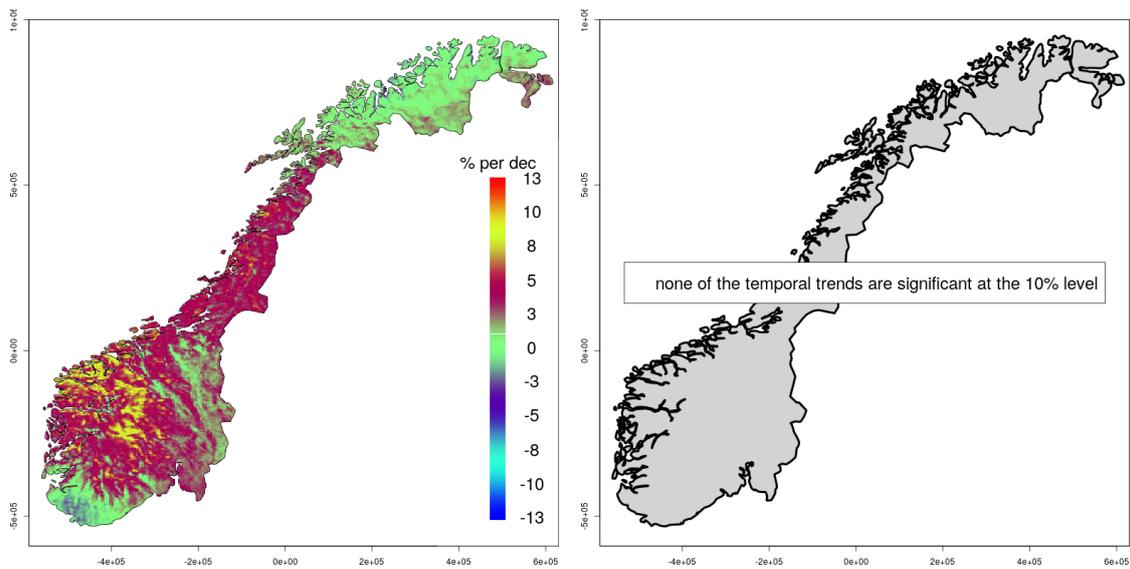


Figure 59: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of September over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

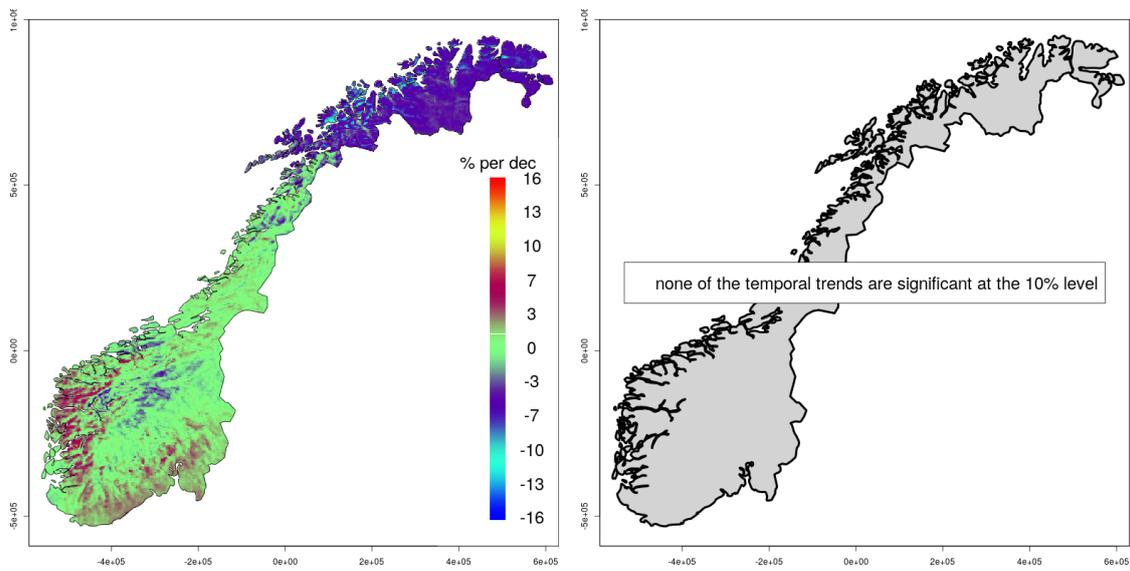


Figure 60: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of October over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

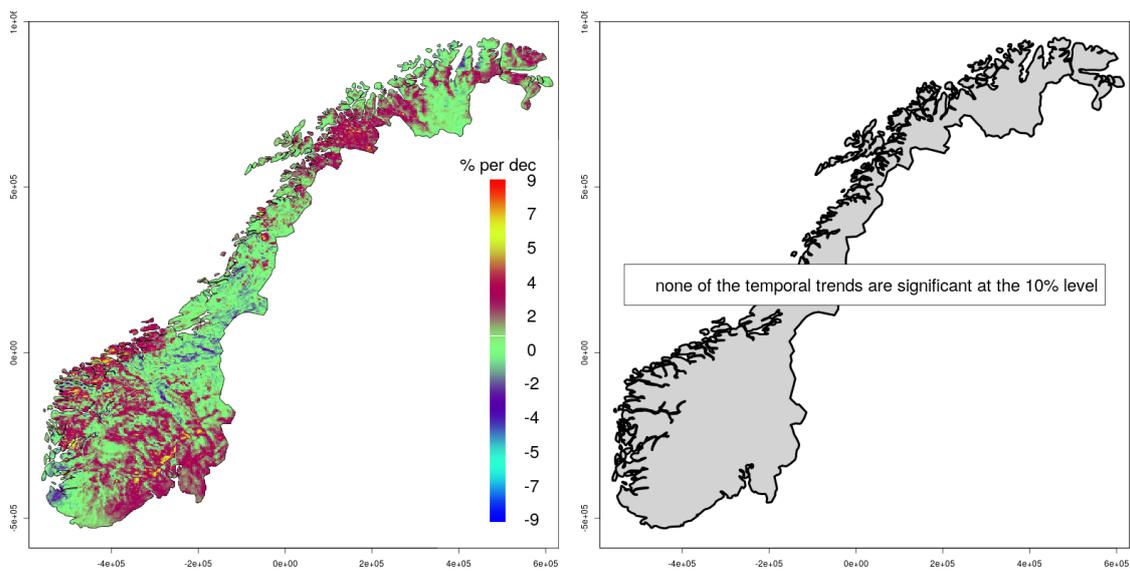


Figure 61: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of November over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

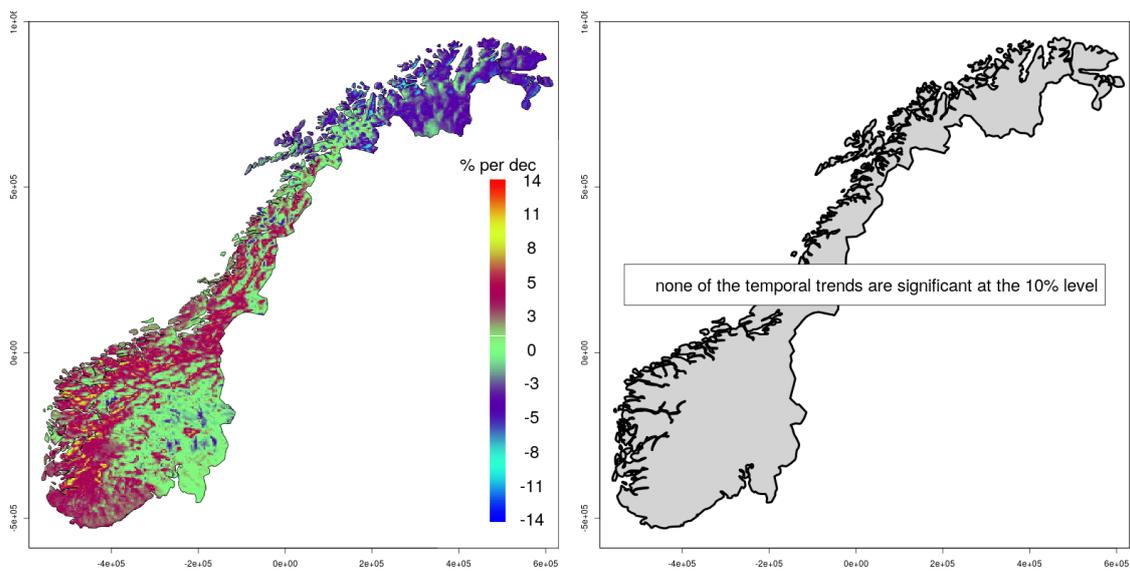


Figure 62: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of December over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

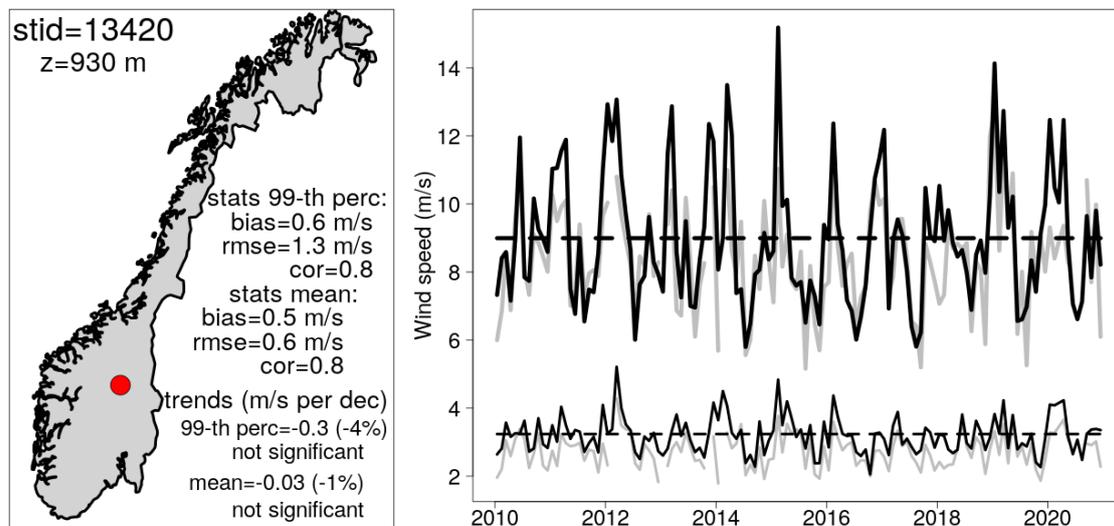


Figure 63: Venabu (station ID 13420). Time series of the monthly averaged 10-metre wind speed (thin lines, gray for the observed, black for NORA3, dashed black is the Theil-Sen linear fitting) and the monthly 99-th percentile of the daily averaged wind speed (thick lines, same meaning as the thin lines). The left panel shows the station location (red dot), the elevation (z), the slopes of the linear regressions ("99-th perc" and "mean"), with the corresponding p-values.

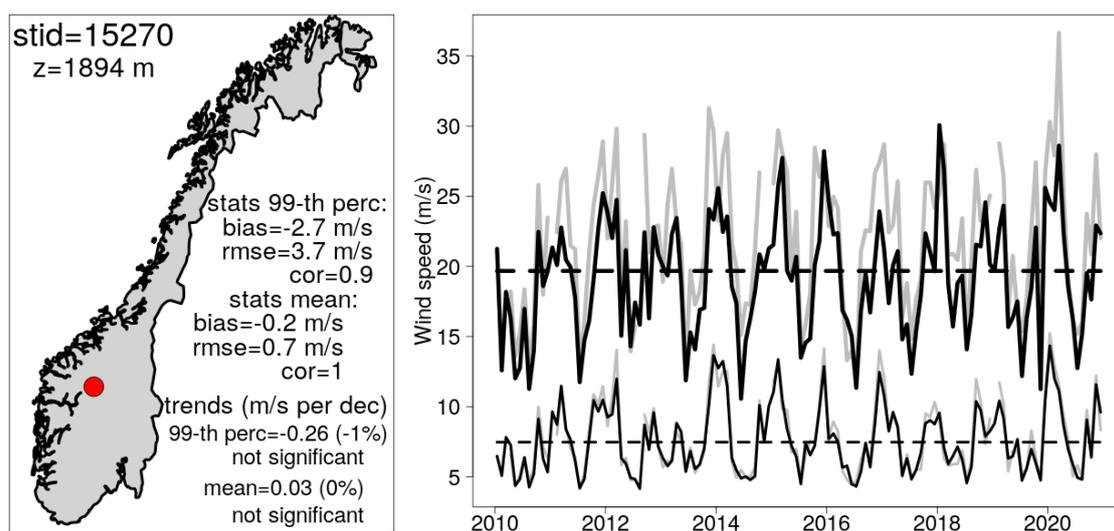


Figure 64: Juvvasshøe. Same layout as in Fig.63

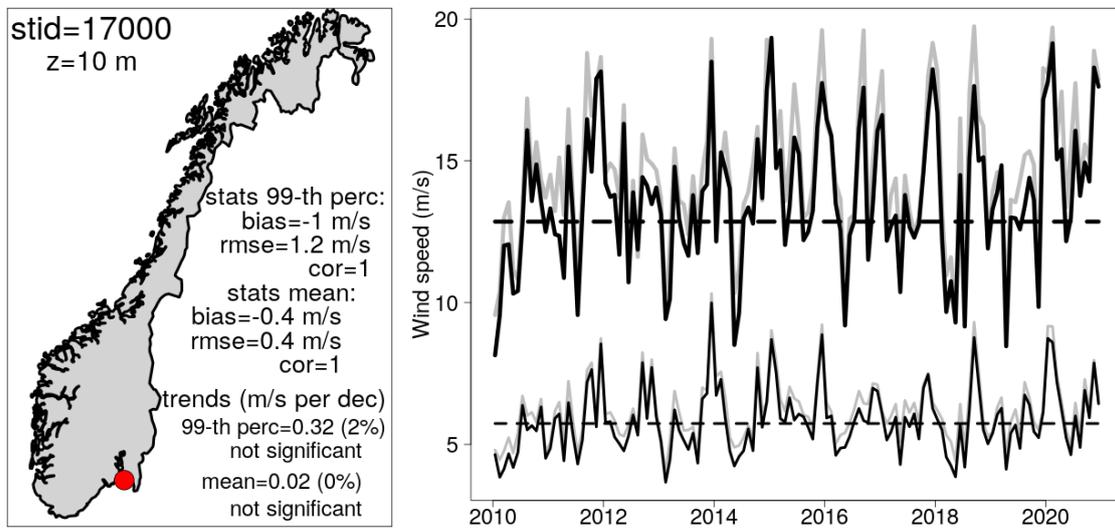


Figure 65: Strømtangen Fyr. Same layout as in Fig.63

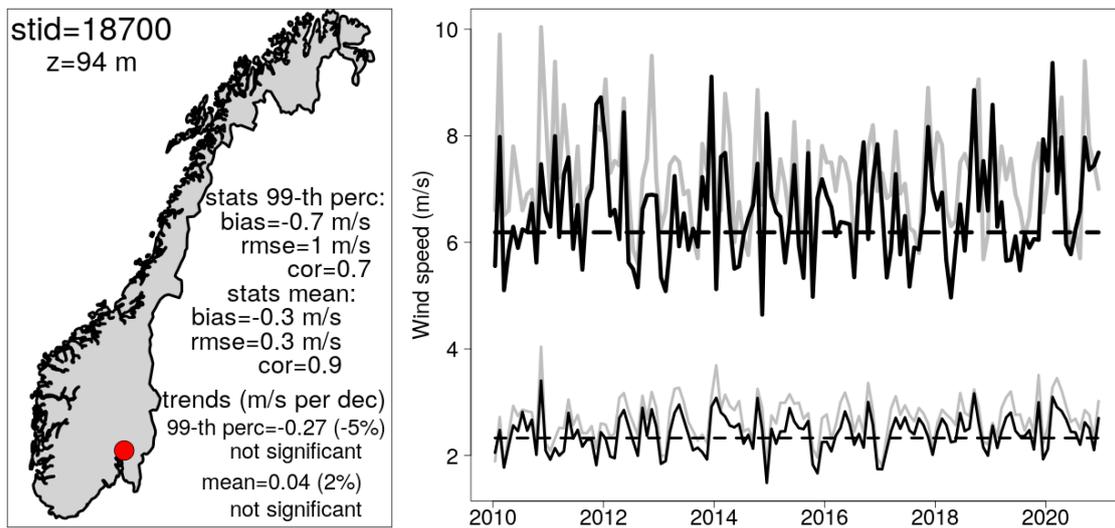


Figure 66: Oslo. Same layout as in Fig.63

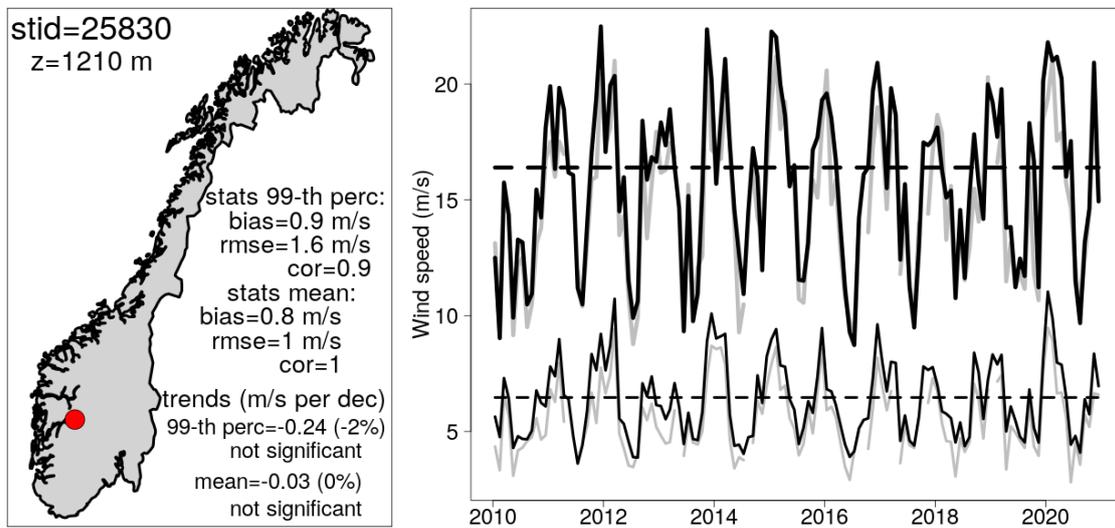


Figure 67: Finsevatn. Same layout as in Fig.63

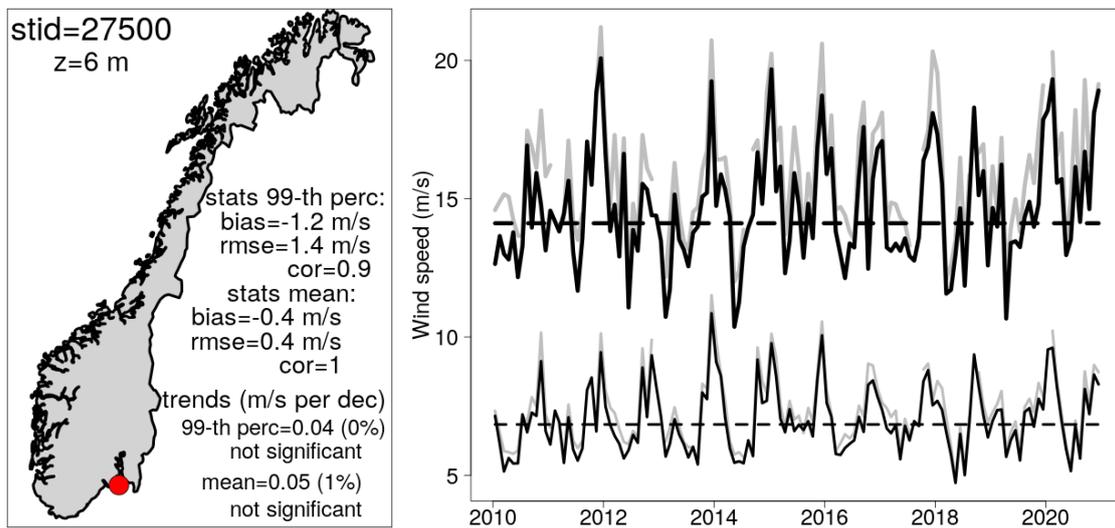


Figure 68: Færder Fyr. Same layout as in Fig.63

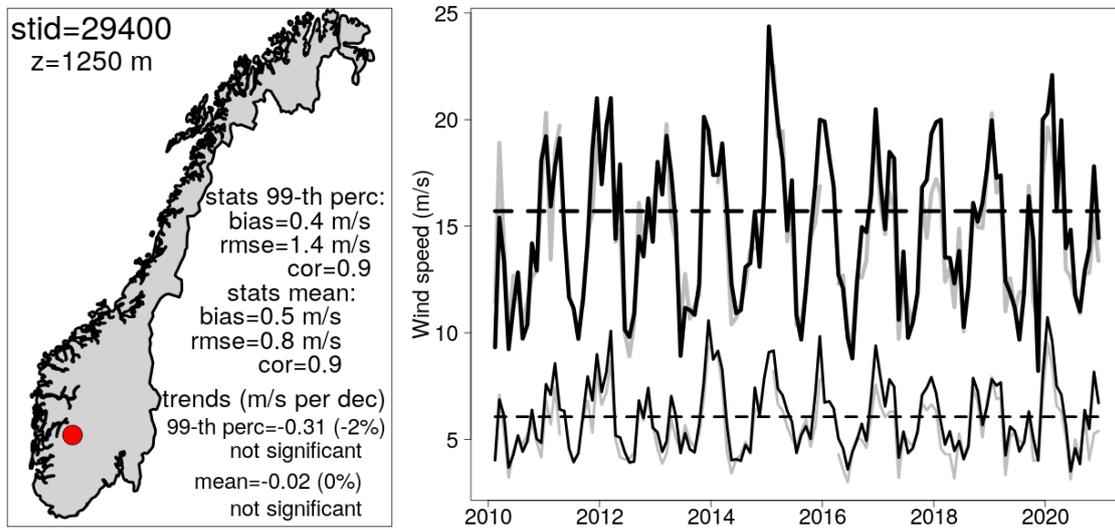


Figure 69: Sandhaug. Same layout as in Fig.63

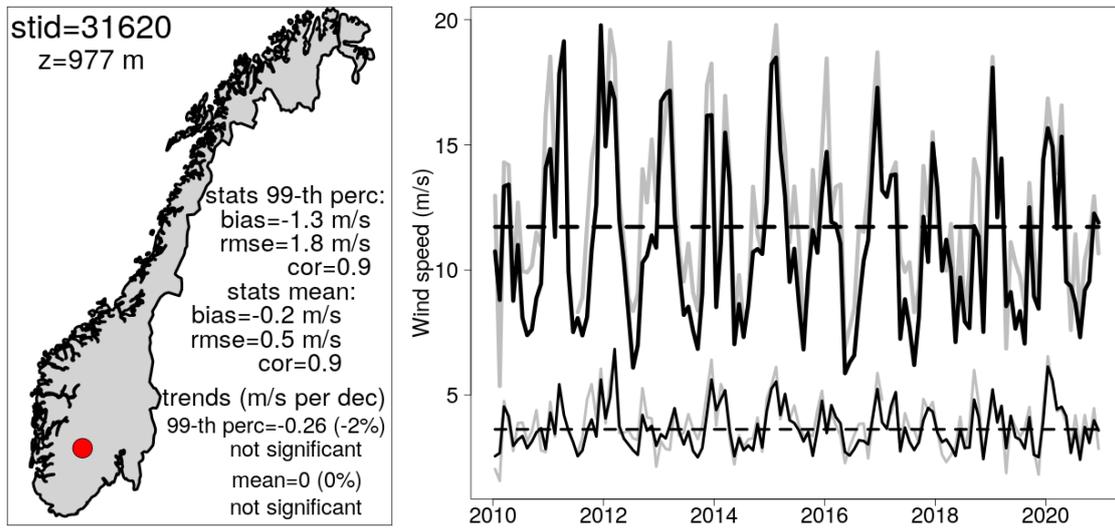


Figure 70: Møsstrand. Same layout as in Fig.63

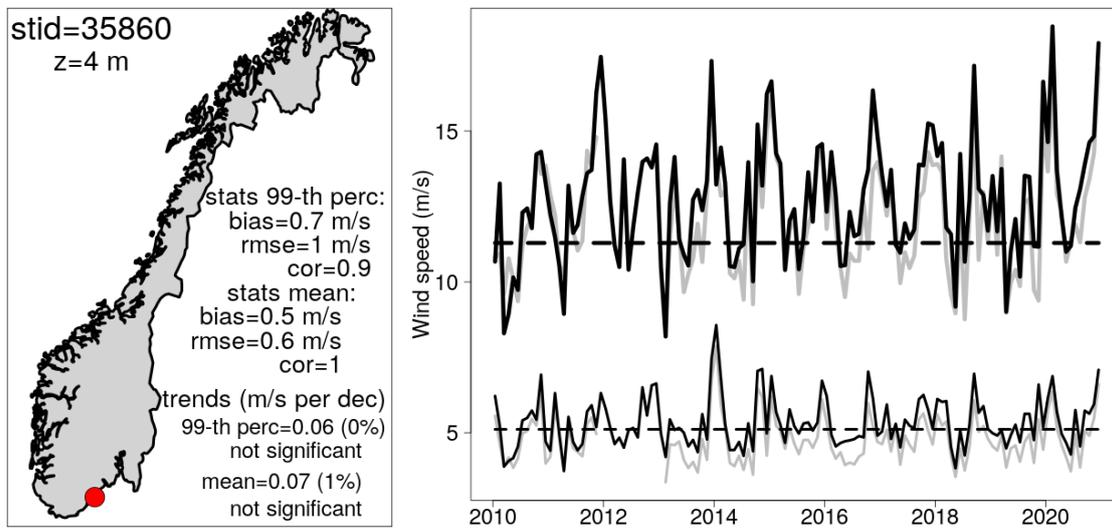


Figure 71: Lyngør Fyr. Same layout as in Fig.63

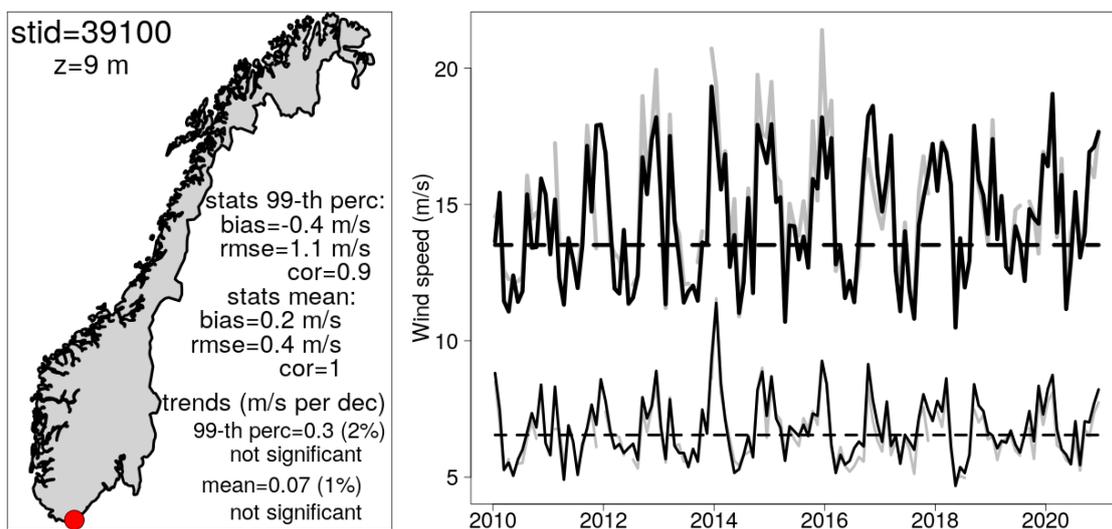


Figure 72: Oksøy Fyr. Same layout as in Fig.63

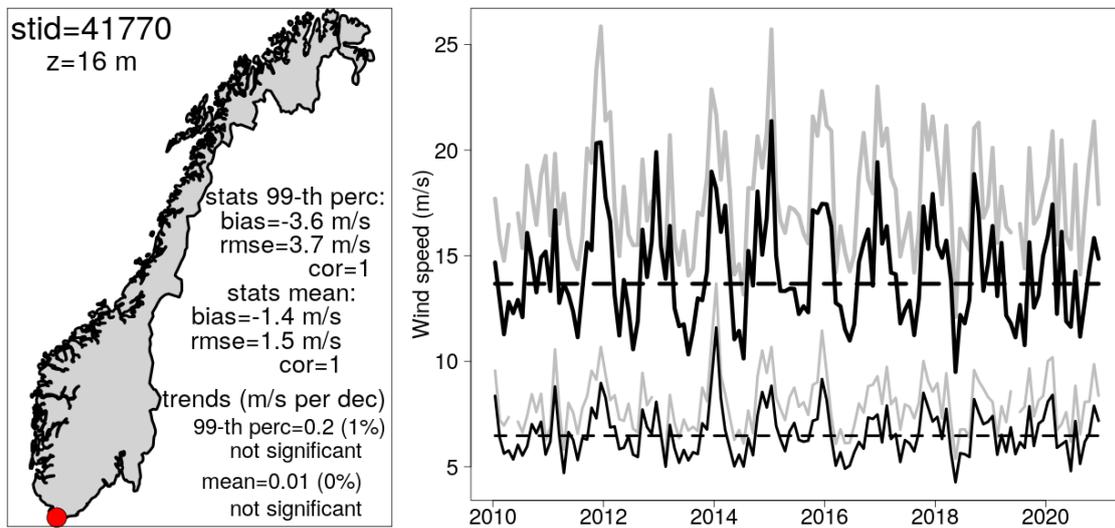


Figure 73: Lindesnes Fyr. Same layout as in Fig.63

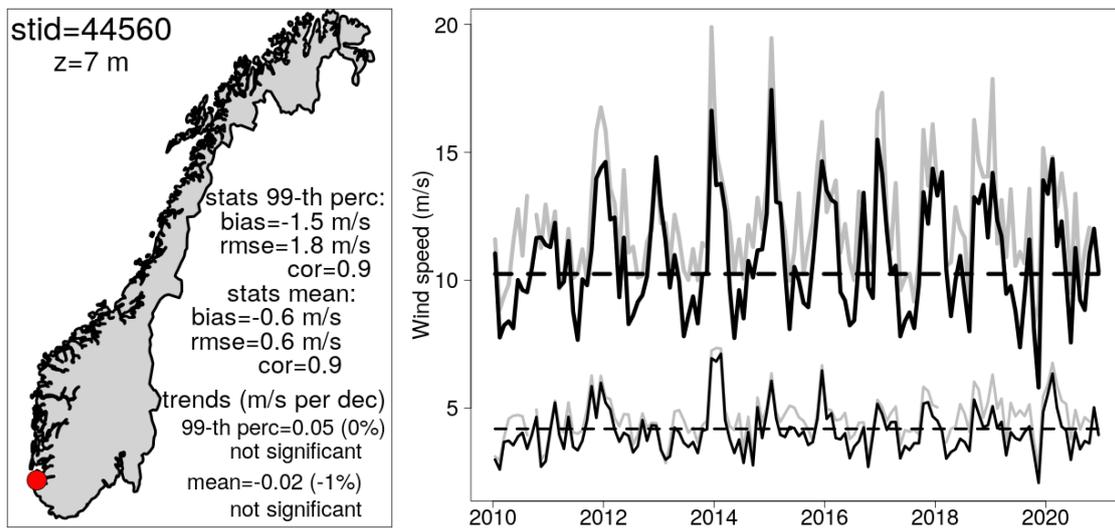


Figure 74: Sola-Stavanger. Same layout as in Fig.63

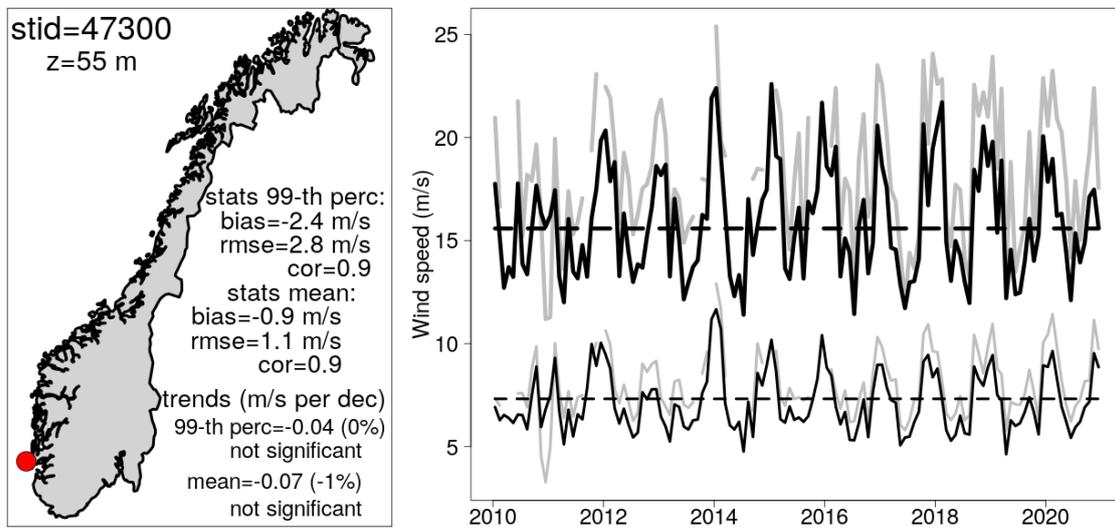


Figure 75: Utsira Fyr. Same layout as in Fig.63

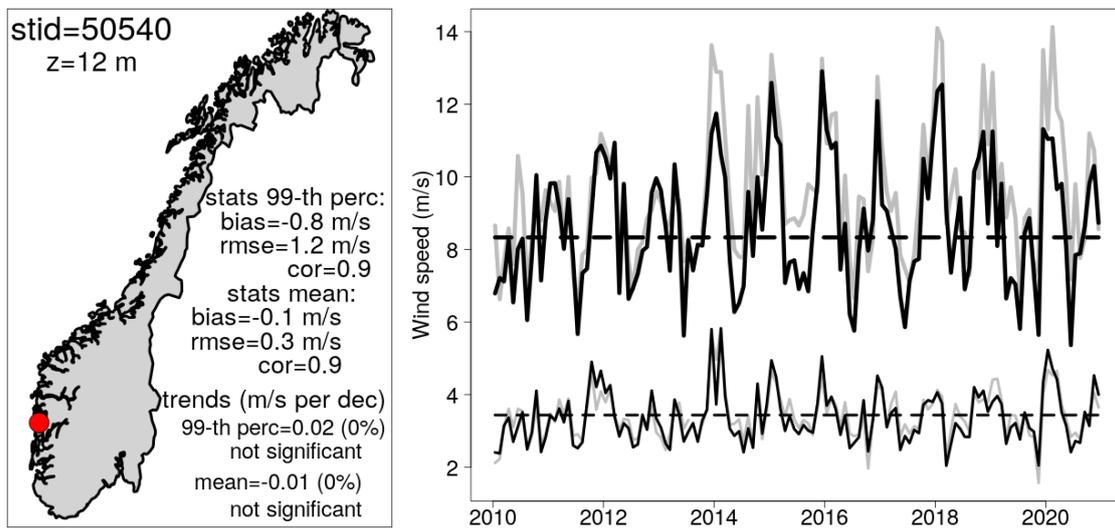


Figure 76: Bergen (Florida). Same layout as in Fig.63

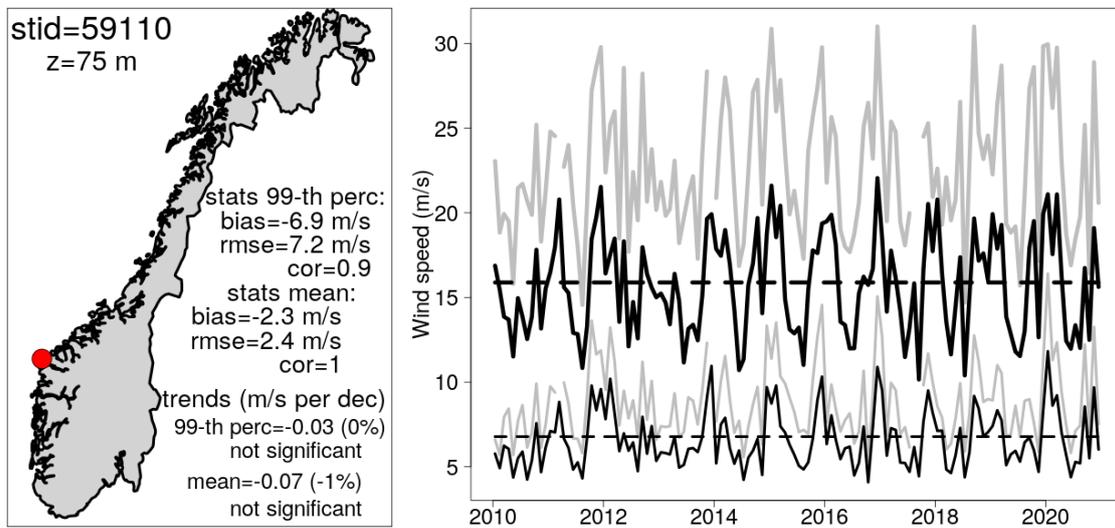


Figure 77: Kråkenes. Same layout as in Fig.63

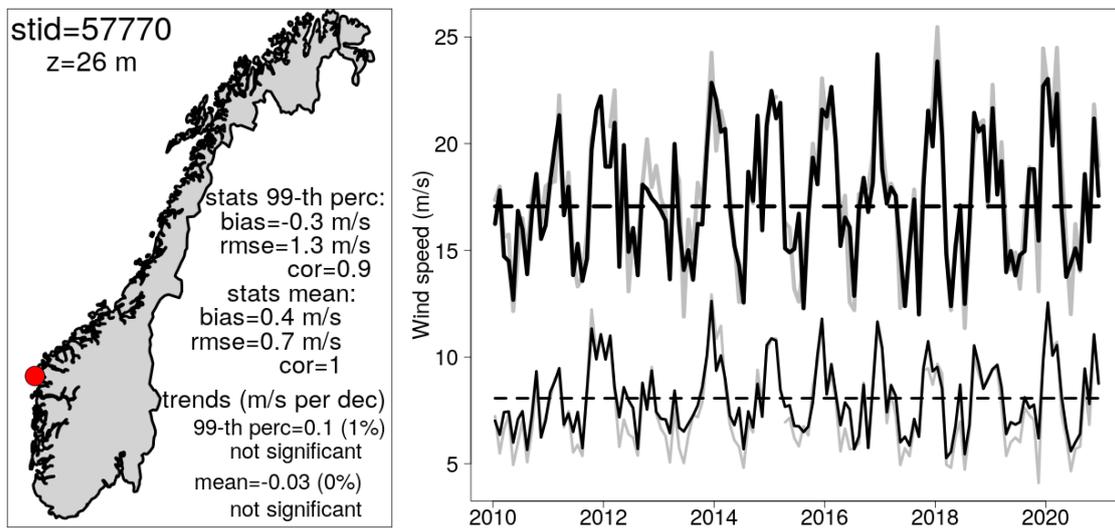


Figure 78: Ytterøyane. Same layout as in Fig.63

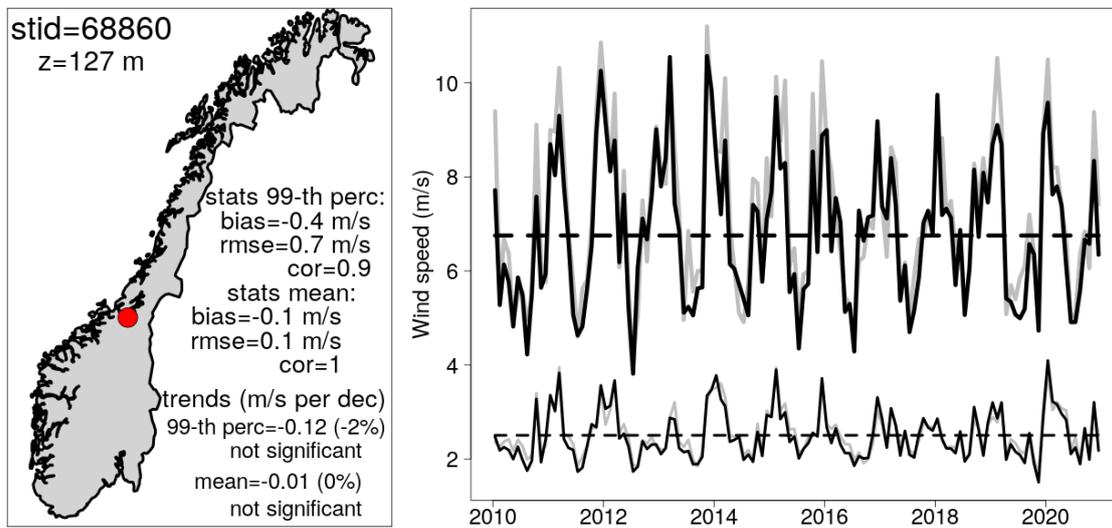


Figure 79: Trondheim. Same layout as in Fig.63

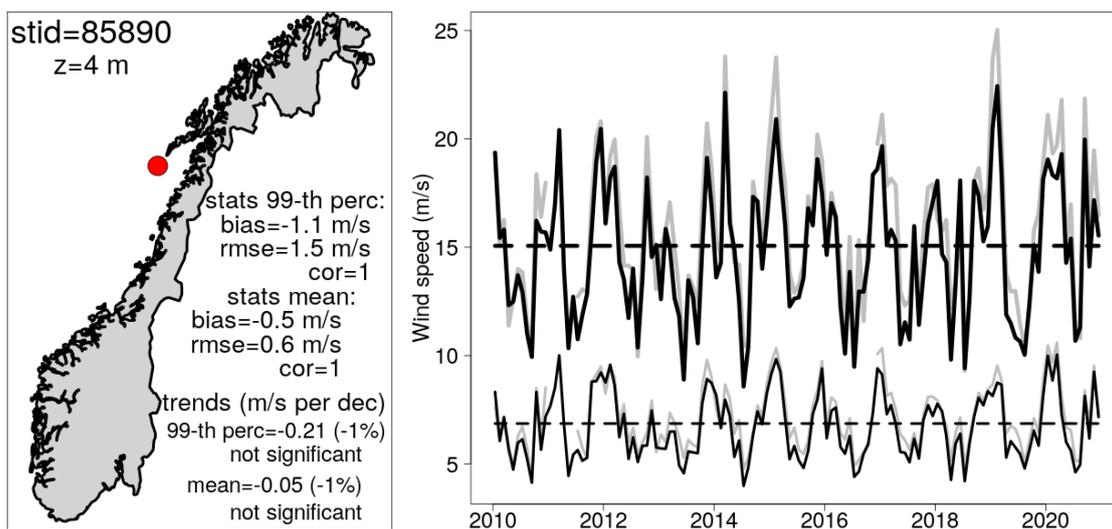


Figure 80: Røst lufthavn. Same layout as in Fig.63

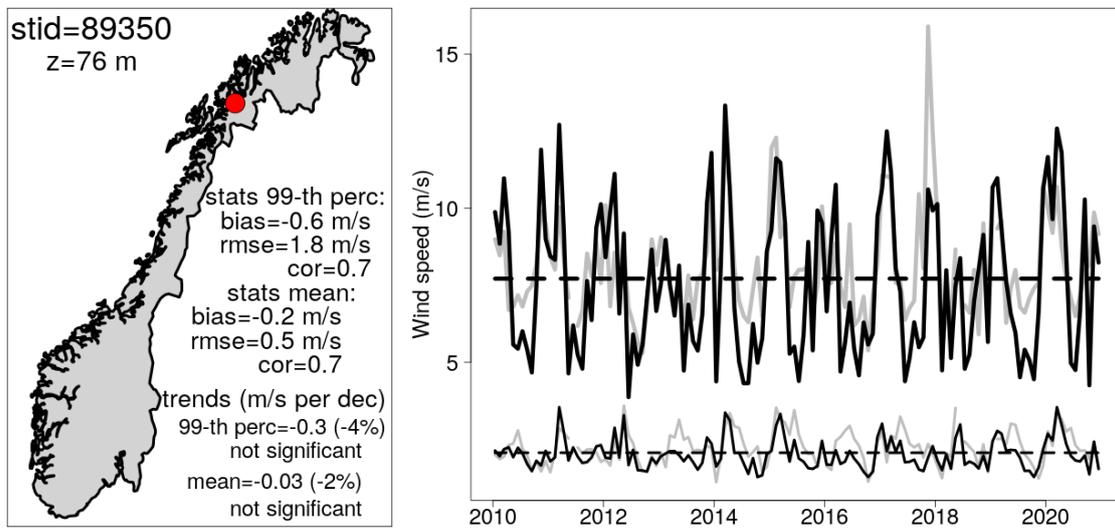


Figure 81: Bardufoss. Same layout as in Fig.63

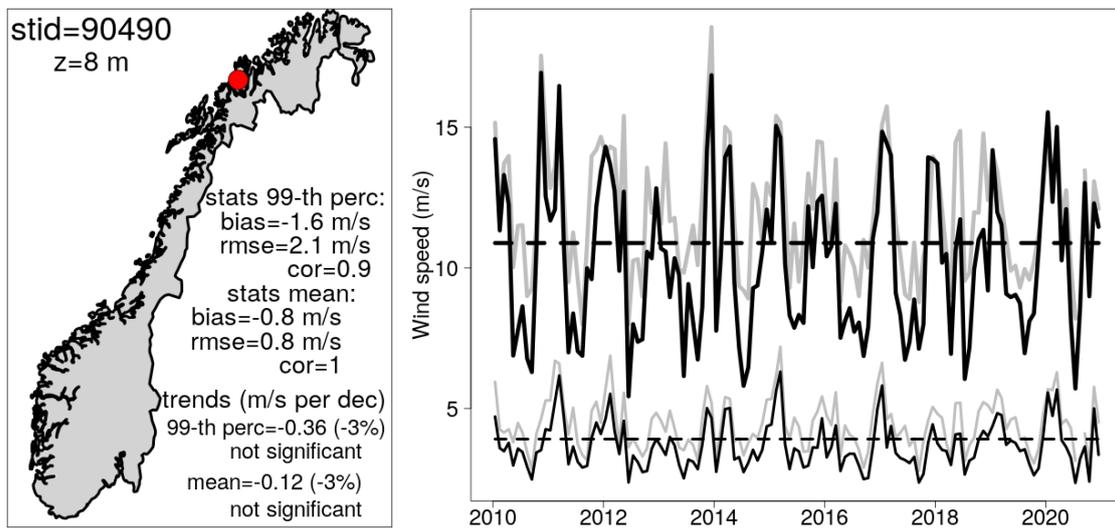


Figure 82: Tromsø. Same layout as in Fig.63

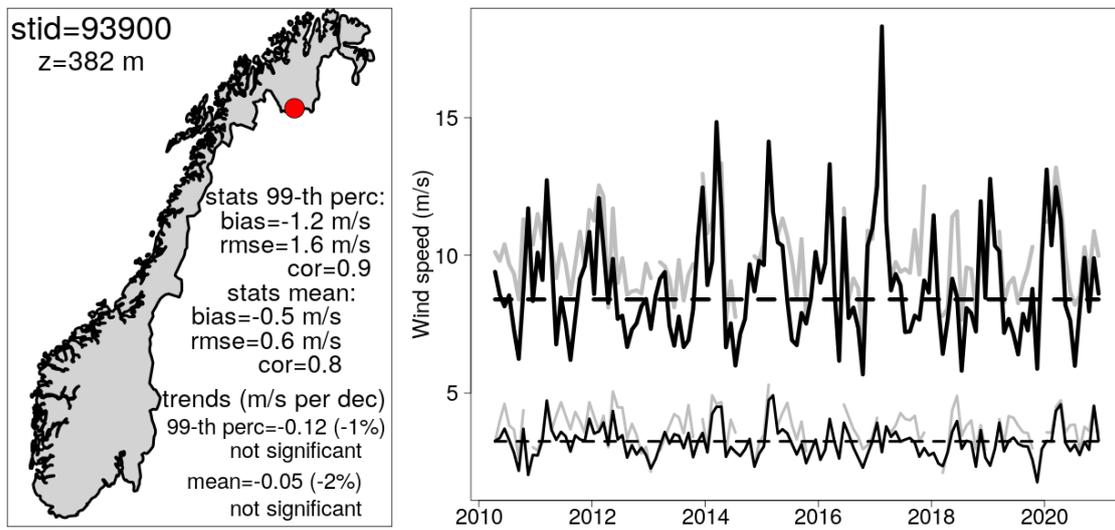


Figure 83: Sihccajauri. Same layout as in Fig.63

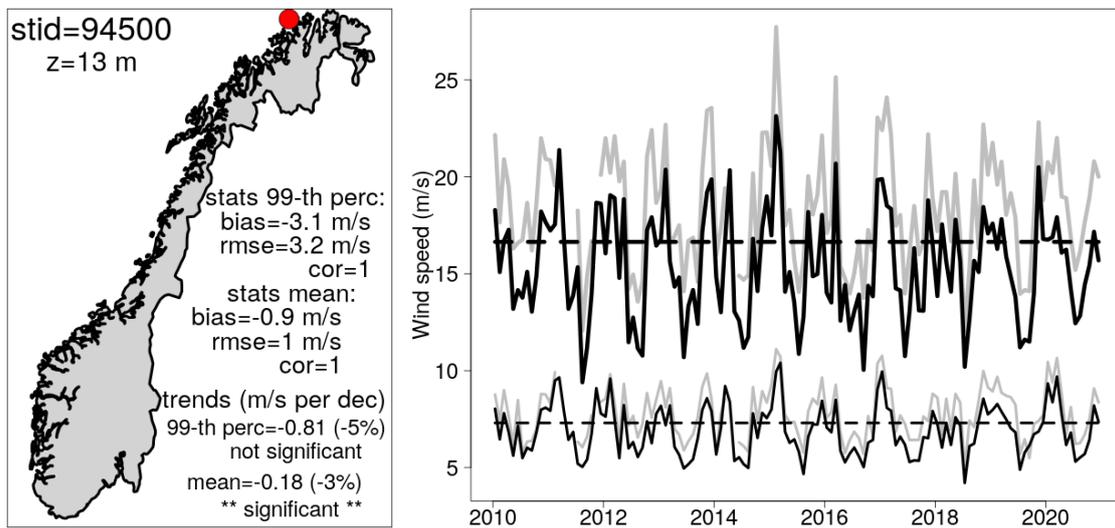


Figure 84: Fruholmen Fyr. Same layout as in Fig.63

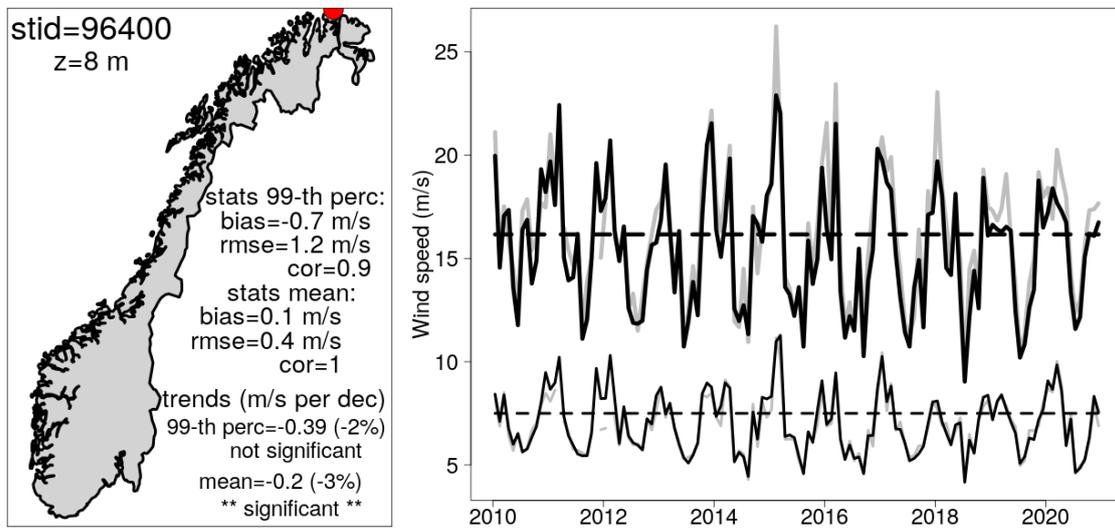


Figure 85: Slettnes Fyr. Same layout as in Fig.63

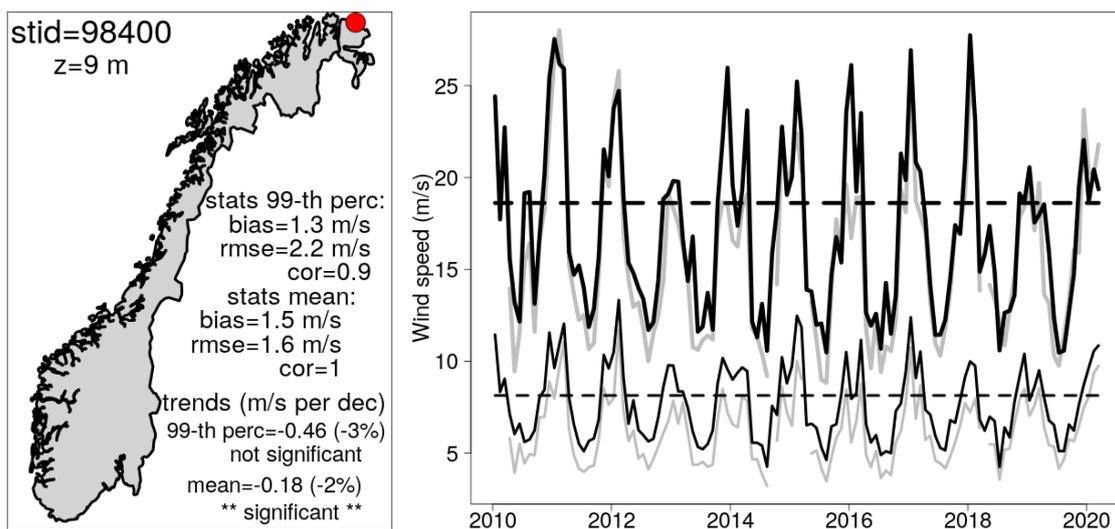


Figure 86: Makkaur Fyr. Same layout as in Fig.63

4 Wind speed climatology over the sea

4.1 Annual aggregated variables

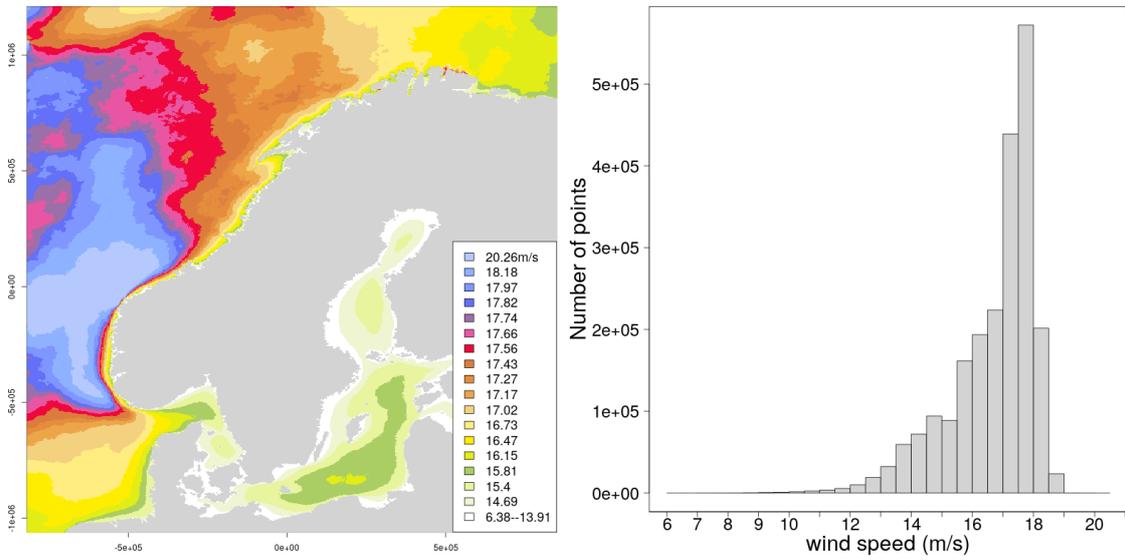


Figure 87: 30-year average (1991–2020) of the 99-th percentile of the annual 10-metre wind speed. Each of the 30 annual values was derived from NORA3 on the basis of all daily mean 10-metre wind speeds.

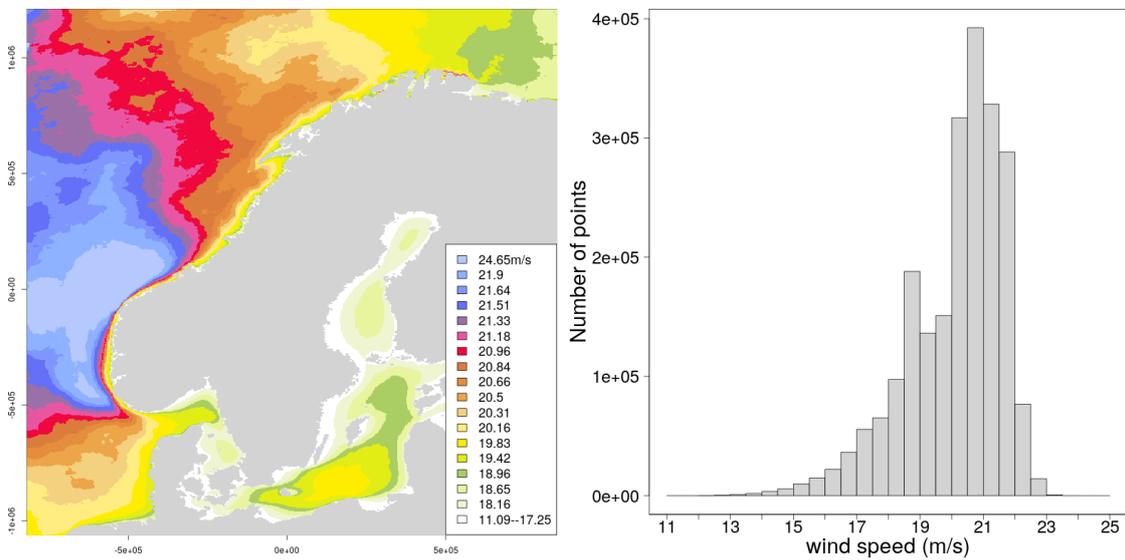


Figure 88: 30-year average (1991–2020) of the 99-th percentile of the annual 100-metre wind speed. Each of the 30 annual values was derived from NORA3 on the basis of all daily mean 100-metre wind speeds.

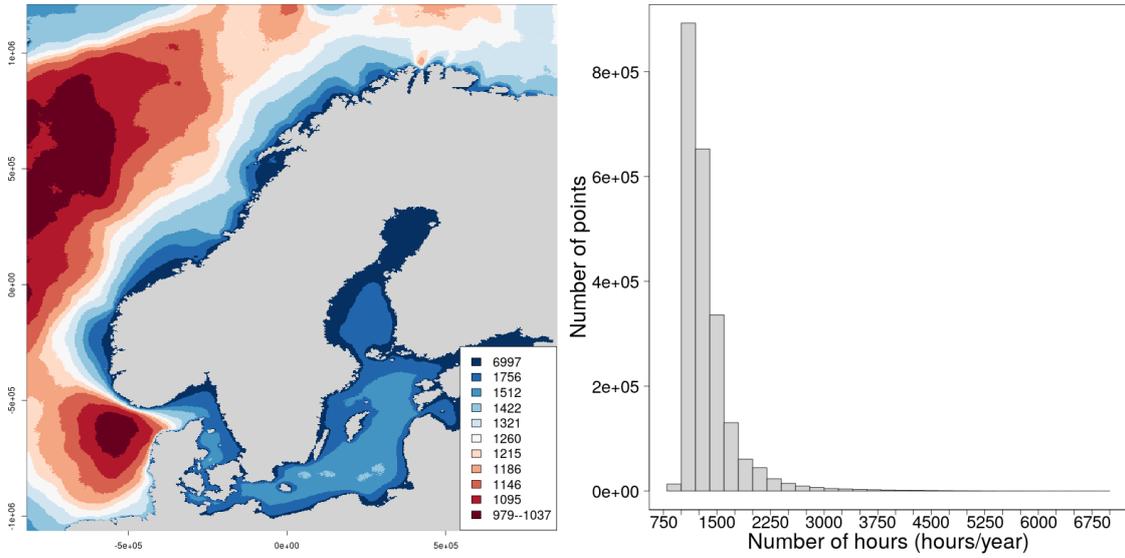


Figure 89: 30-year average (1991–2020) of the number of hours in a year with 10-metre wind speed less than 4 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 10-metre wind speeds.

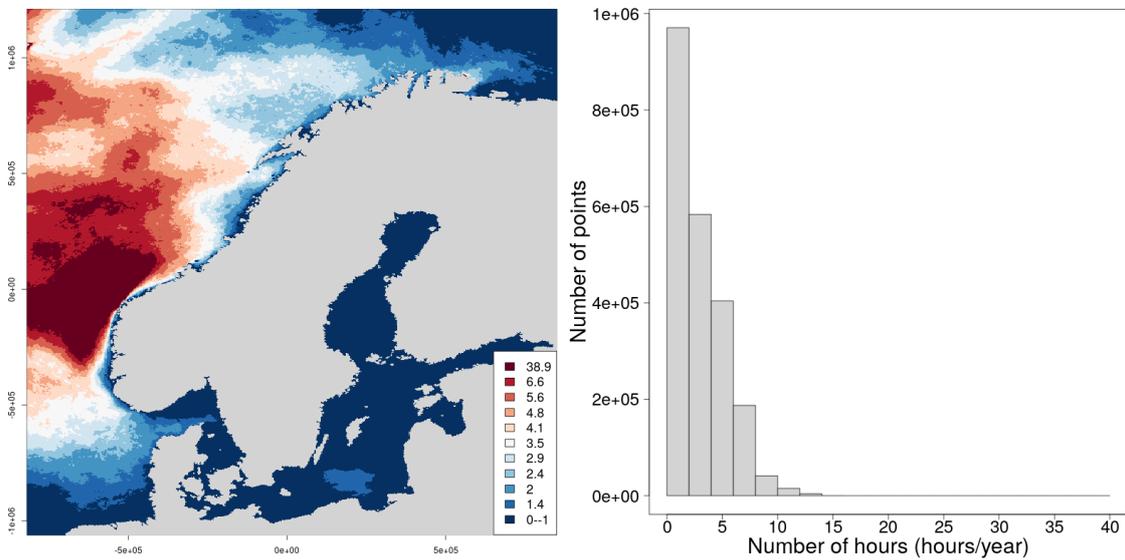


Figure 90: 30-year average (1991–2020) of the number of hours in a year with 10-metre wind speed greater than 25 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 10-metre wind speeds.

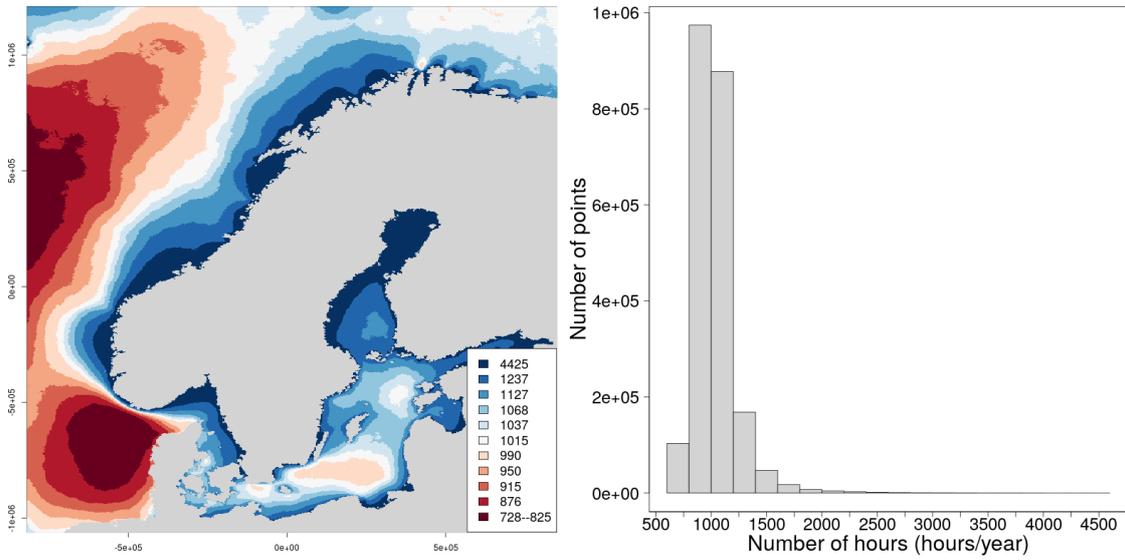


Figure 91: 30-year average (1991–2020) of the number of hours in a year with 100-metre wind speed less than 4 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 100-metre wind speeds.

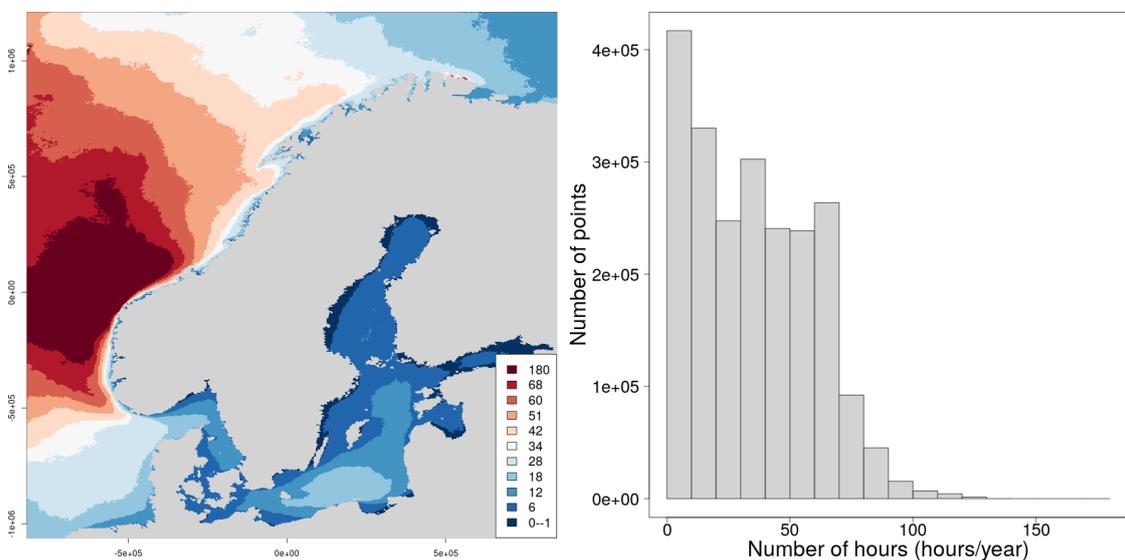


Figure 92: 30-year average (1991–2020) of the number of hours in a year with 100-metre wind speed greater than 25 m/s. Each of the 30 annual values was derived from NORA3 on the basis of all hourly 100-metre wind speeds.

4.1.1 Temporal trends

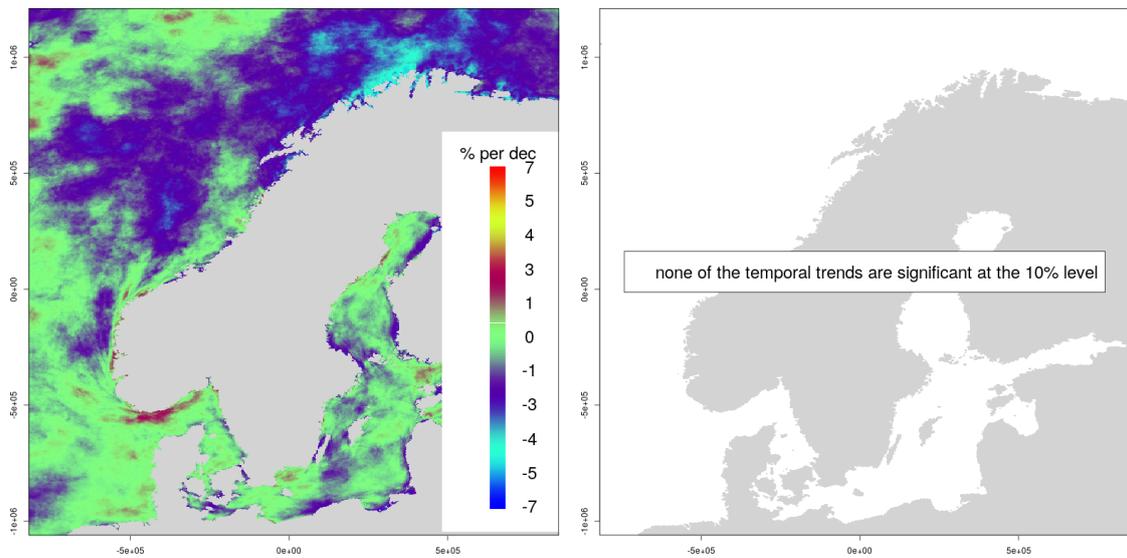


Figure 93: Normalized linear trends (in % of the climate normals per decade) of the annual 99-th percentile of the 10-metre wind speed over the period 1991-2020. At a grid point, each of the 30 annual values used was derived from NORA3 daily averaged 10-metre wind speed. The left panel shows the map of the normalized trends. The global hypothesis of no temporal trends in the data cannot be rejected at any point with 10% significant level.

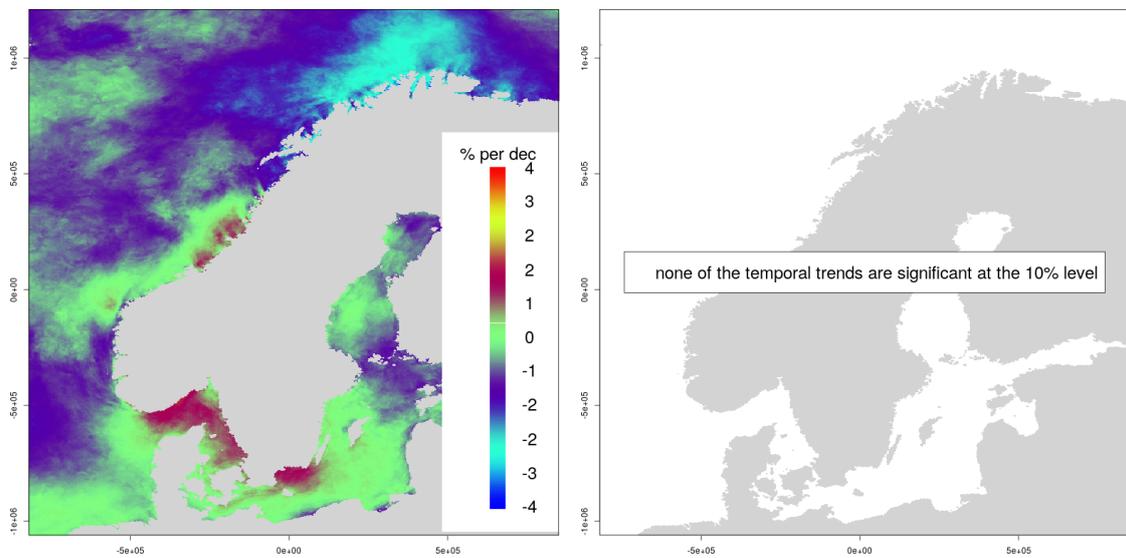


Figure 94: Normalized linear trends (in % of the climate normals per decade) of the annual averaged 100–metre wind speed over the period 1991–2020. At a grid point, each of the 30 annual values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The global hypothesis of no temporal trends in the data cannot be rejected at any point with 10% significant level.

4.2 Monthly aggregated variables

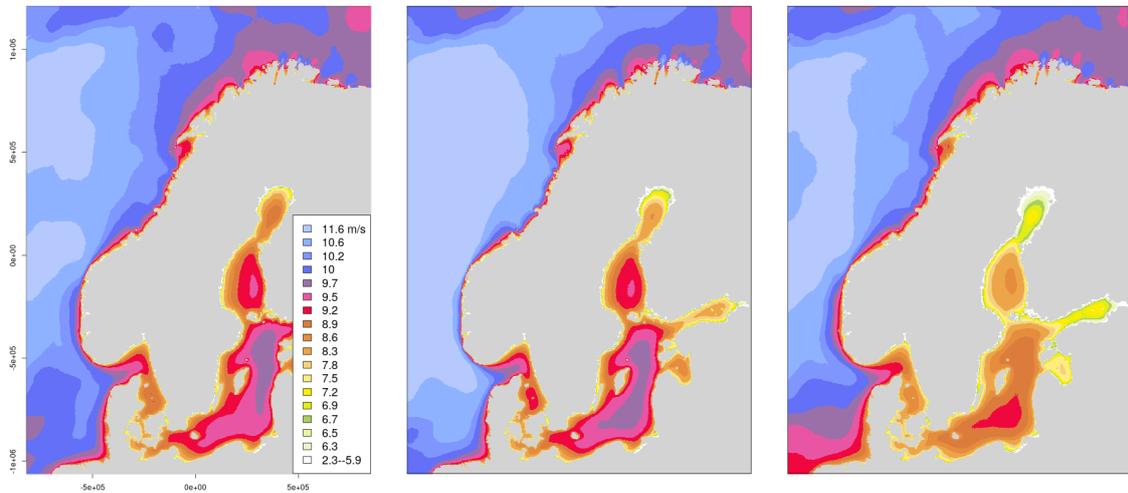


Figure 95: Average 10-metre wind speed 1991–2020 monthly normals. Winter months (left to right): December, January, February.

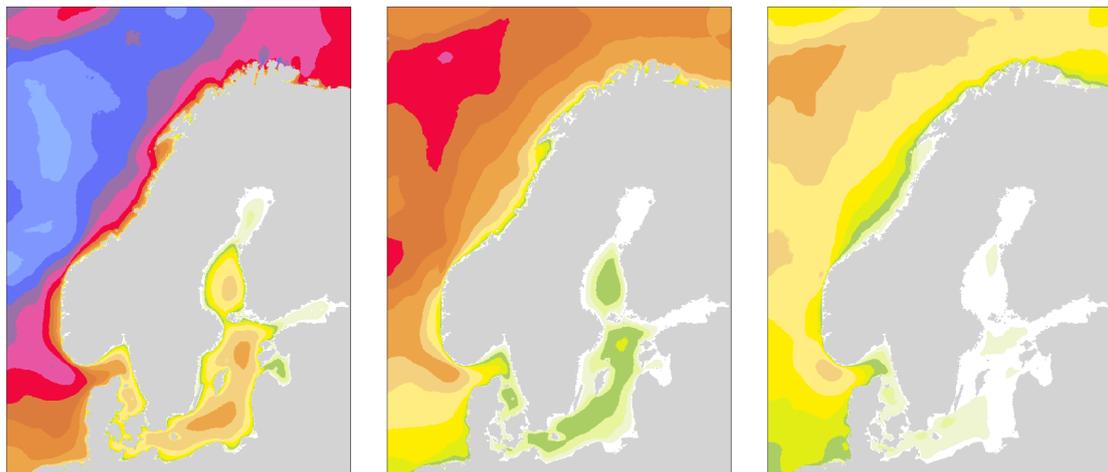


Figure 96: Average 10-metre wind speed 1991–2020 monthly normals. Spring months (left to right): March, April, May. The color scale is the same as for Fig. 95.

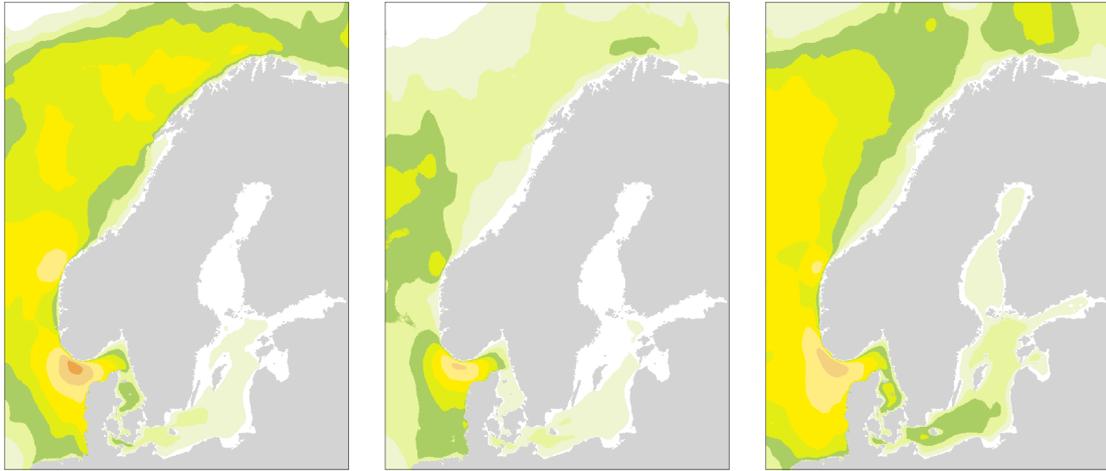


Figure 97: Average 10–metre wind speed 1991–2020 monthly normals. Summer months (left to right): June, July, August. The color scale is the same as for Fig. 95.

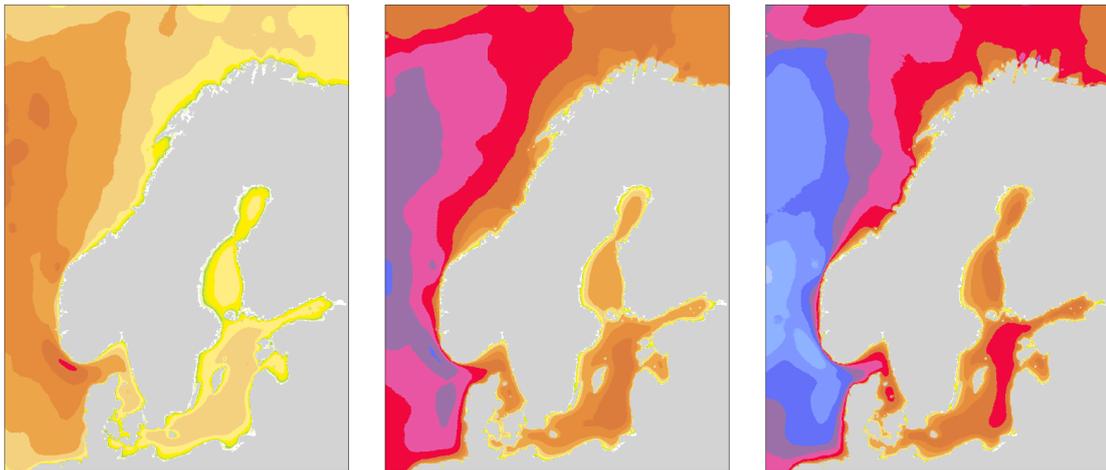


Figure 98: Average 10–metre wind speed 1991–2020 monthly normals. Autumn months (left to right): September, October, November. The color scale is the same as for Fig. 95.

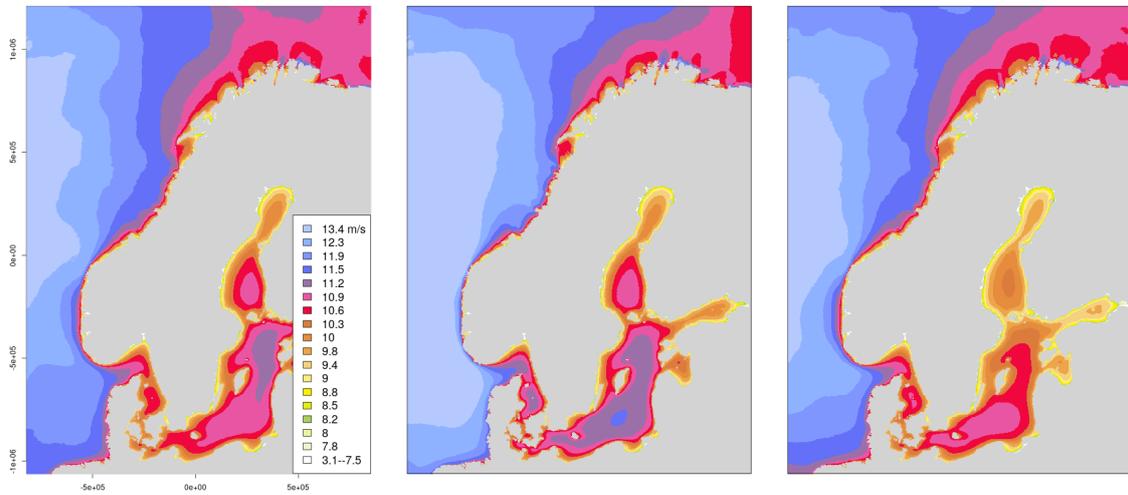


Figure 99: Average 100–metre wind speed 1991–2020 monthly normals. Winter months (left to right): December, January, February.

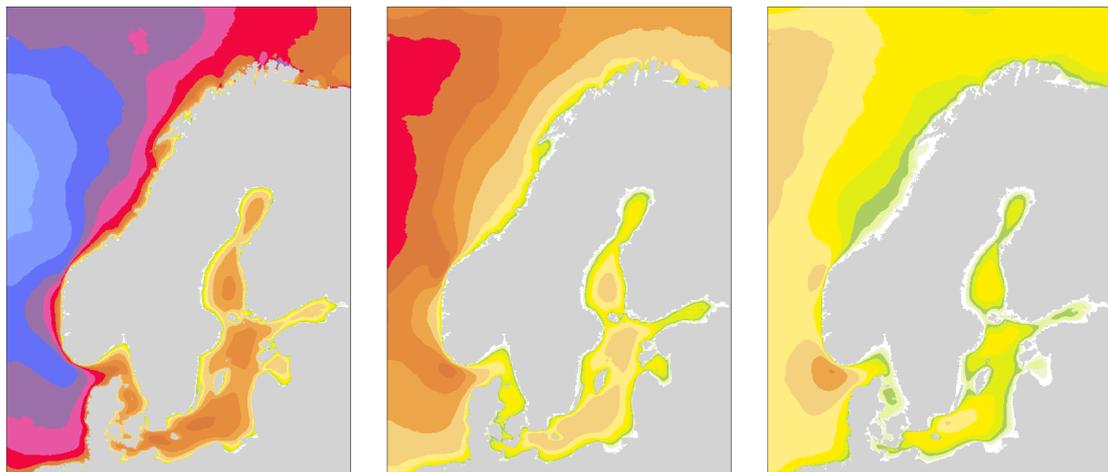


Figure 100: Average 100–metre wind speed 1991–2020 monthly normals. Spring months (left to right): March, April, May. The color scale is the same as for Fig. 99.

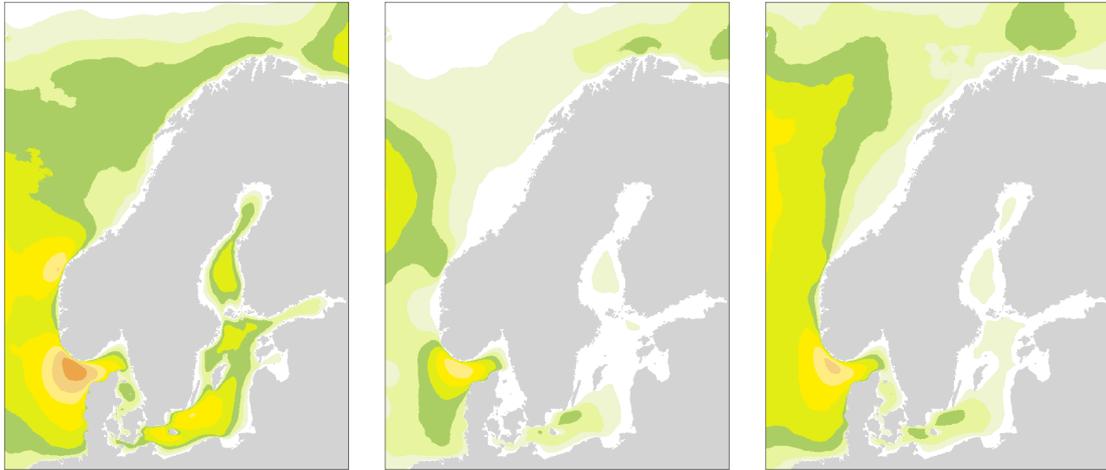


Figure 101: Average 100-metre wind speed 1991–2020 monthly normals. Summer months (left to right): June, July, August. The color scale is the same as for Fig. 99.

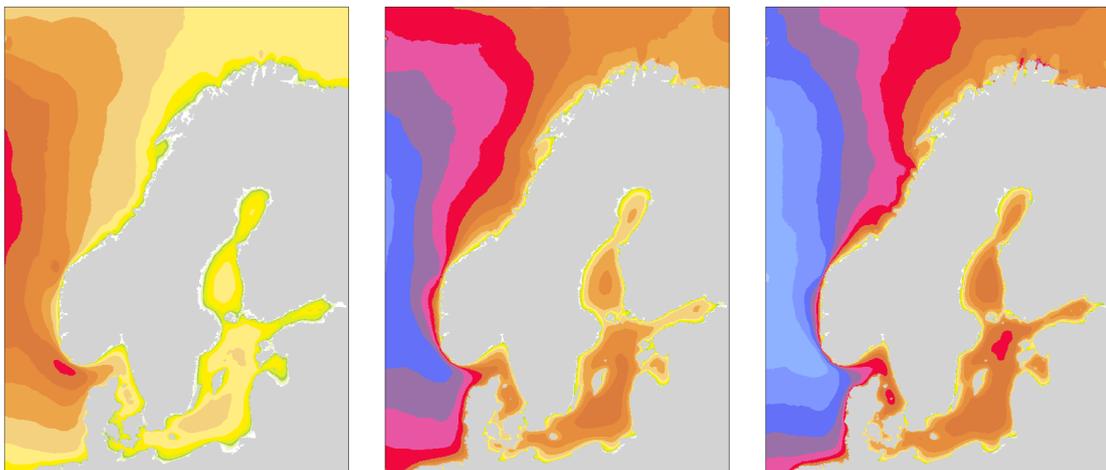


Figure 102: Average 100-metre wind speed 1991–2020 monthly normals. Autumn months (left to right): September, October, November. The color scale is the same as for Fig. 99.

4.2.1 Temporal trends

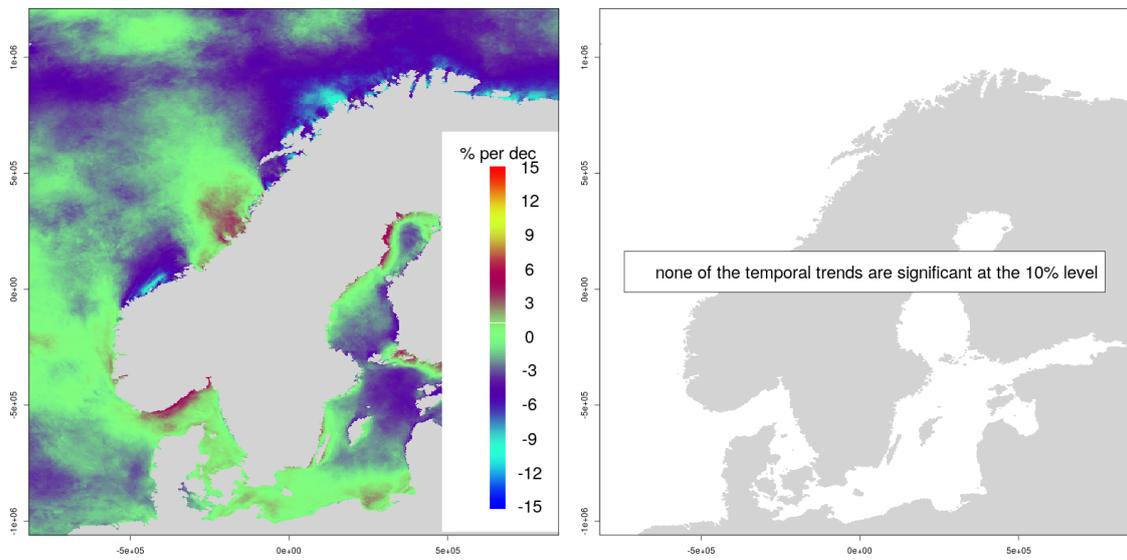


Figure 103: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of January over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

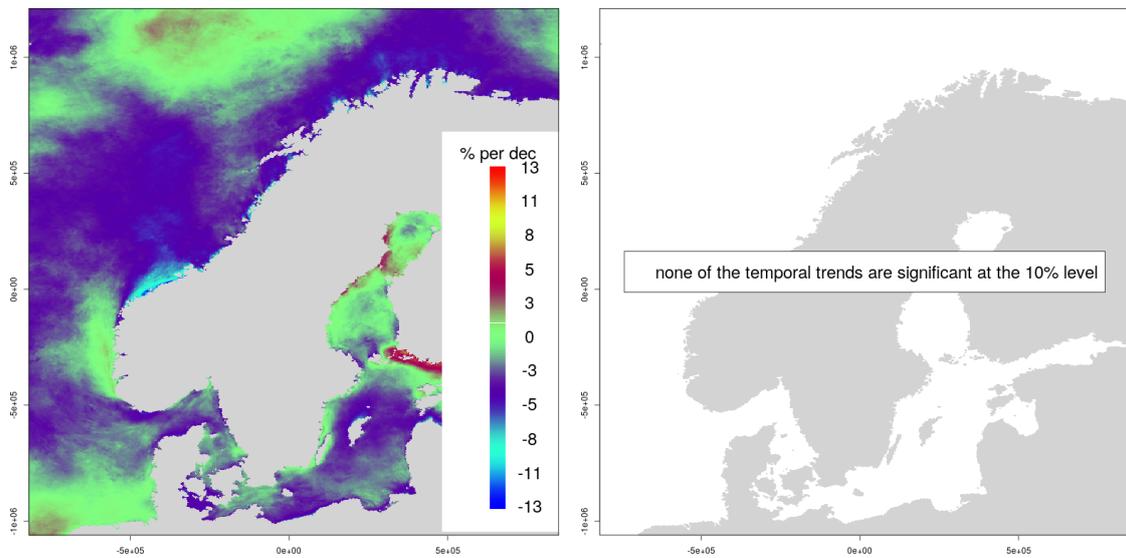


Figure 104: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of February over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

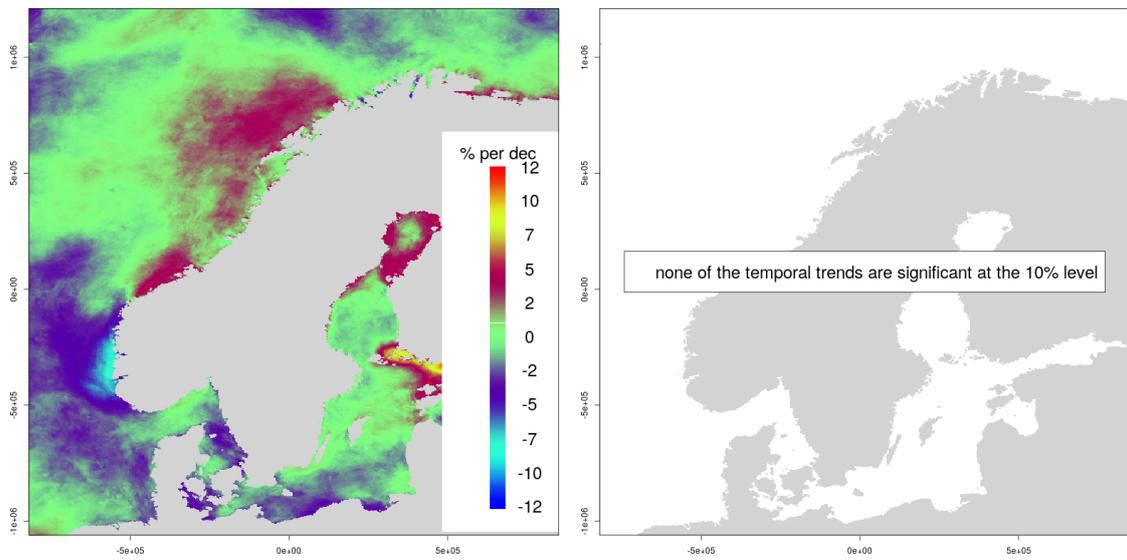


Figure 105: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of March over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

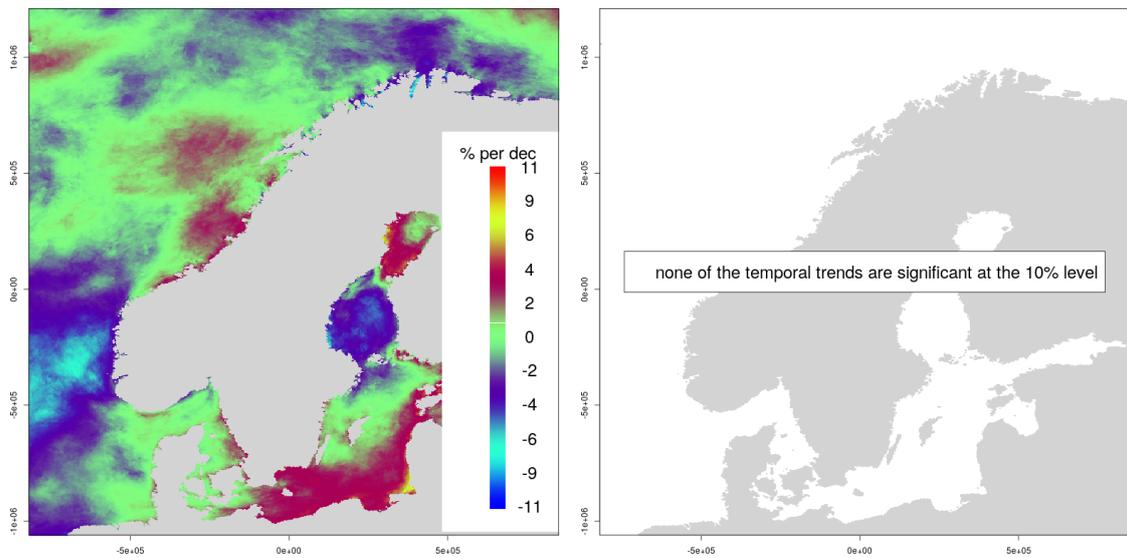


Figure 106: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of April over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

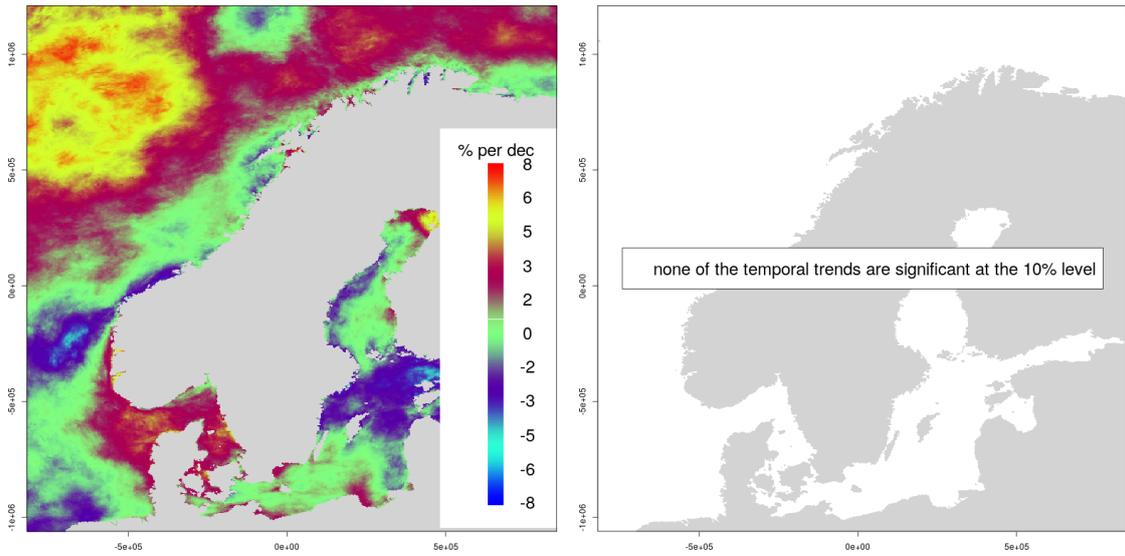


Figure 107: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of May over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

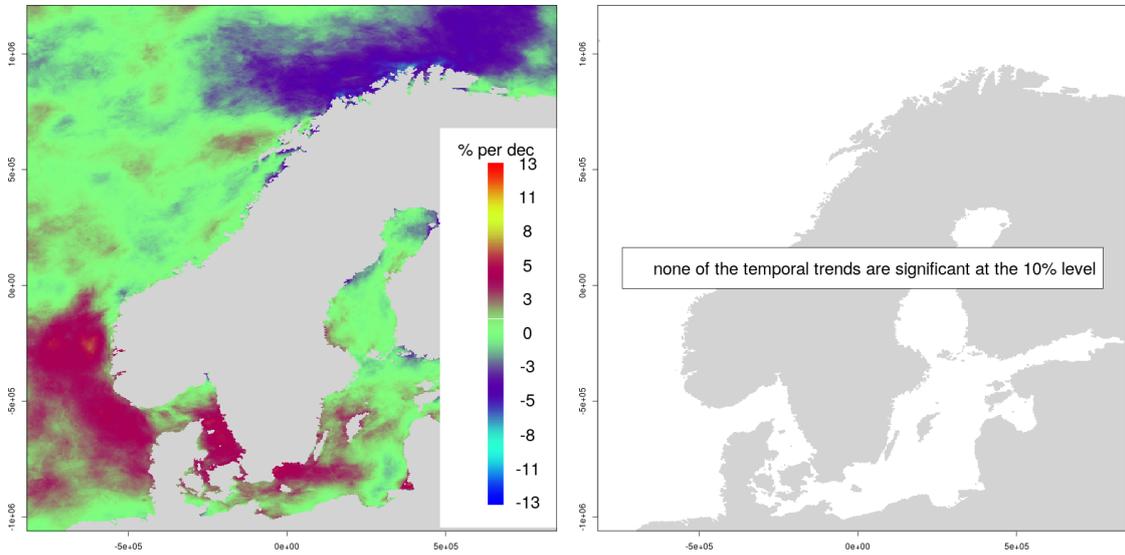


Figure 108: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of July over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

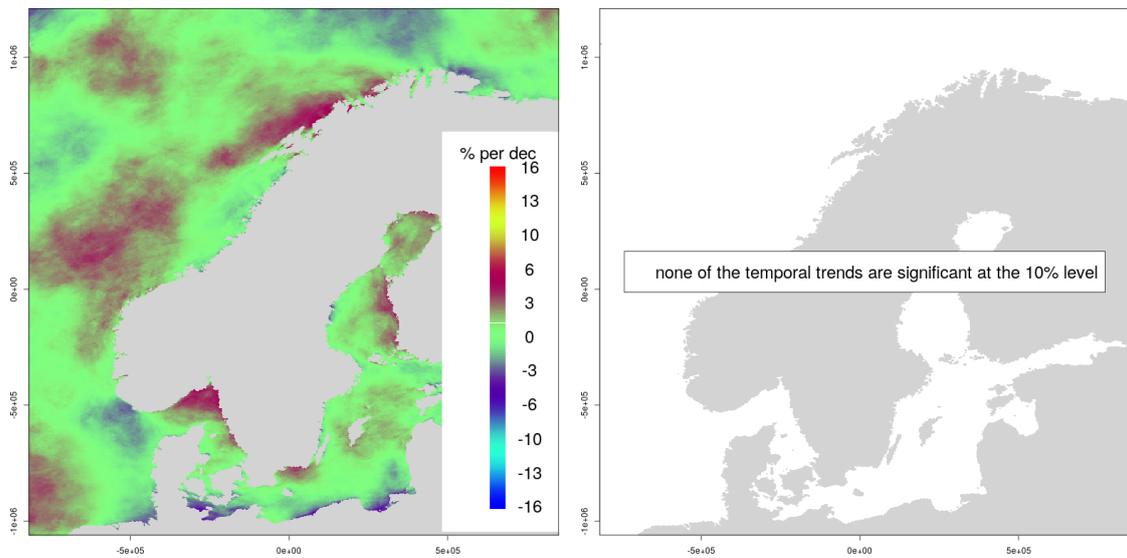


Figure 109: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of August over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

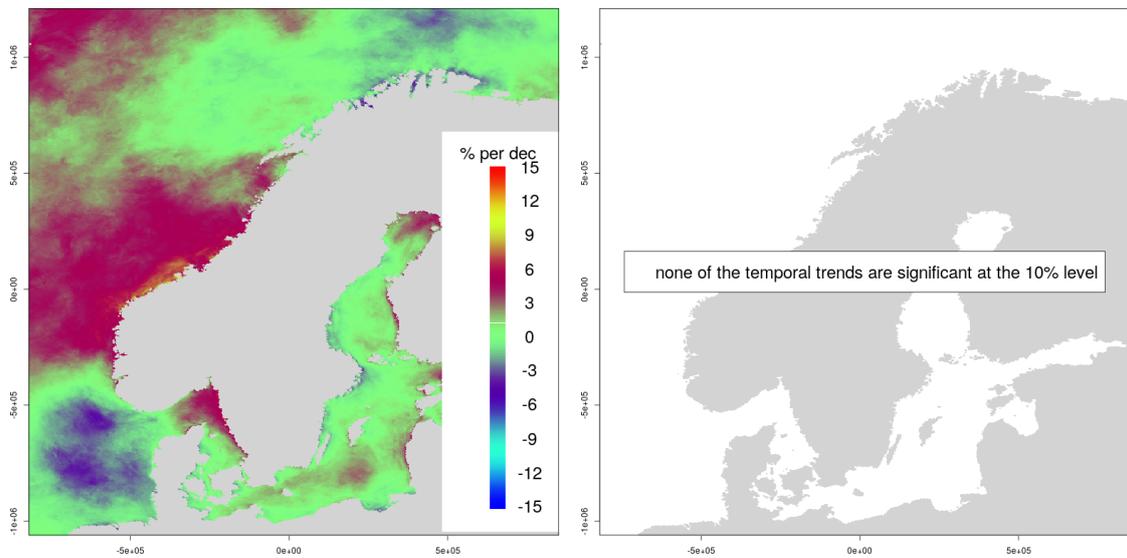


Figure 110: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of September over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

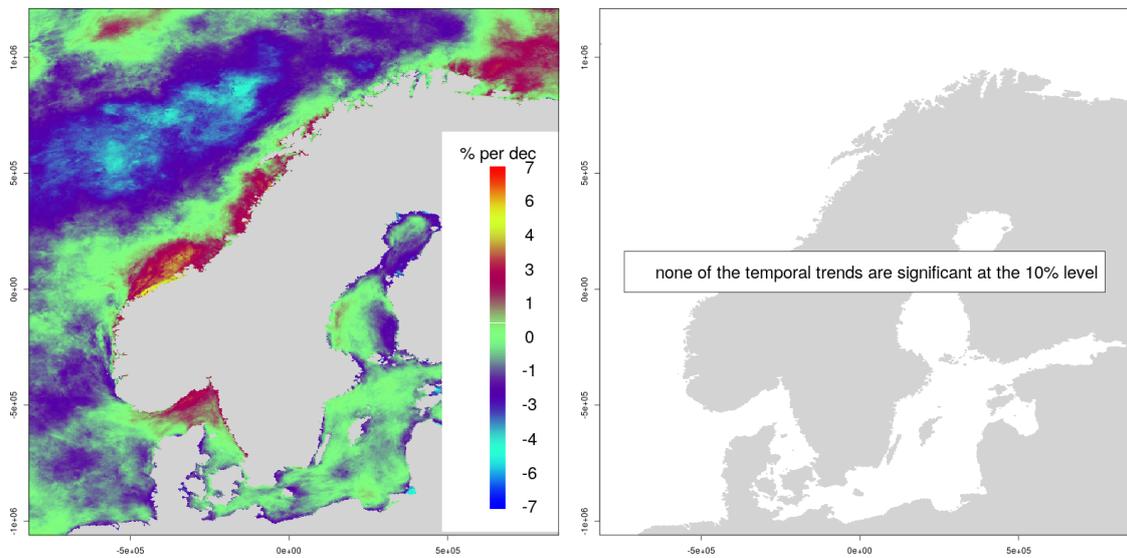


Figure 111: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of November over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

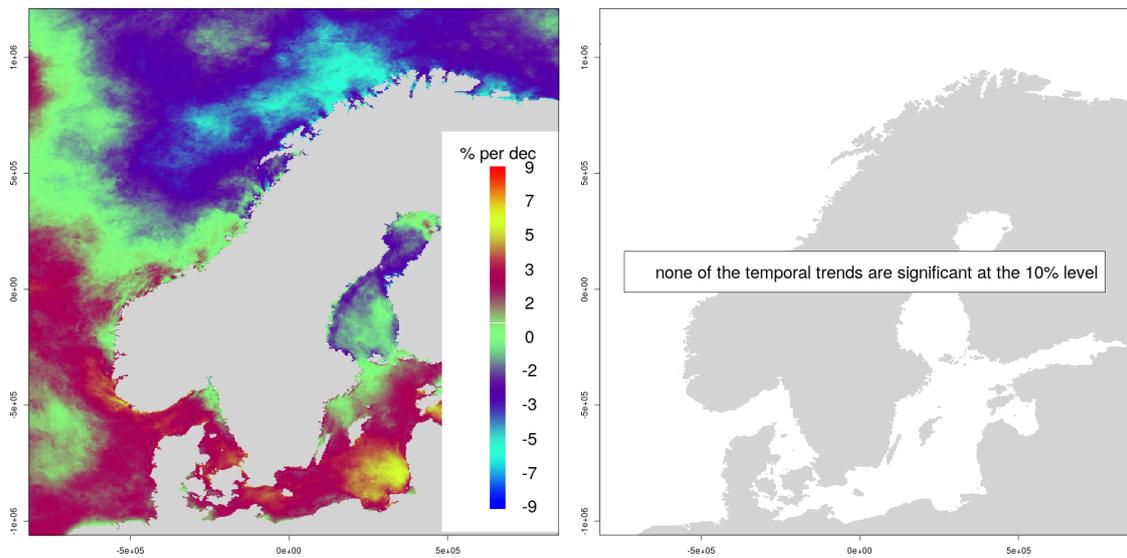


Figure 112: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 10–metre wind speed for the month of December over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 10–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

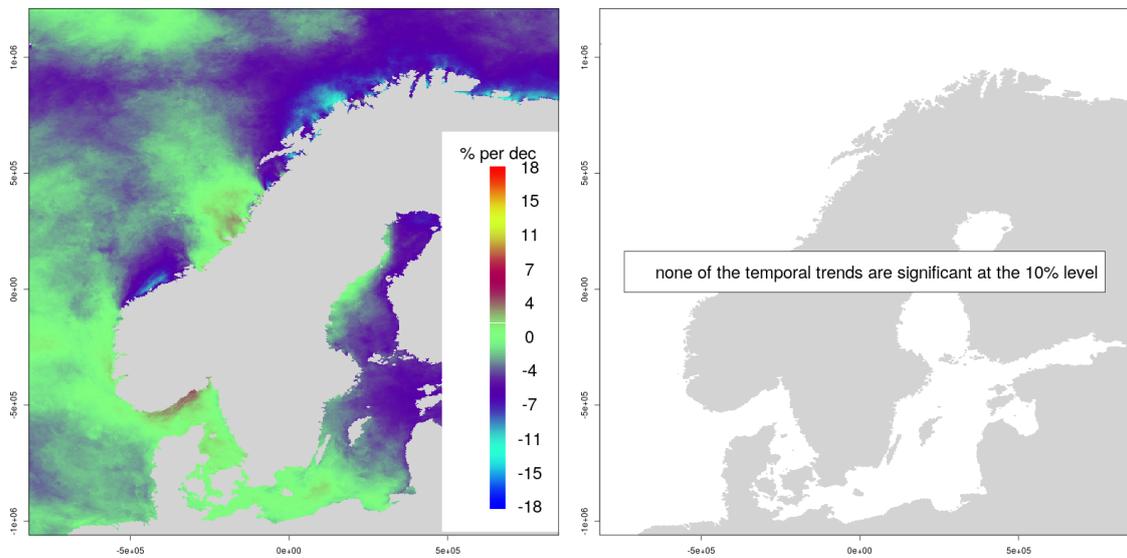


Figure 113: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of January over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

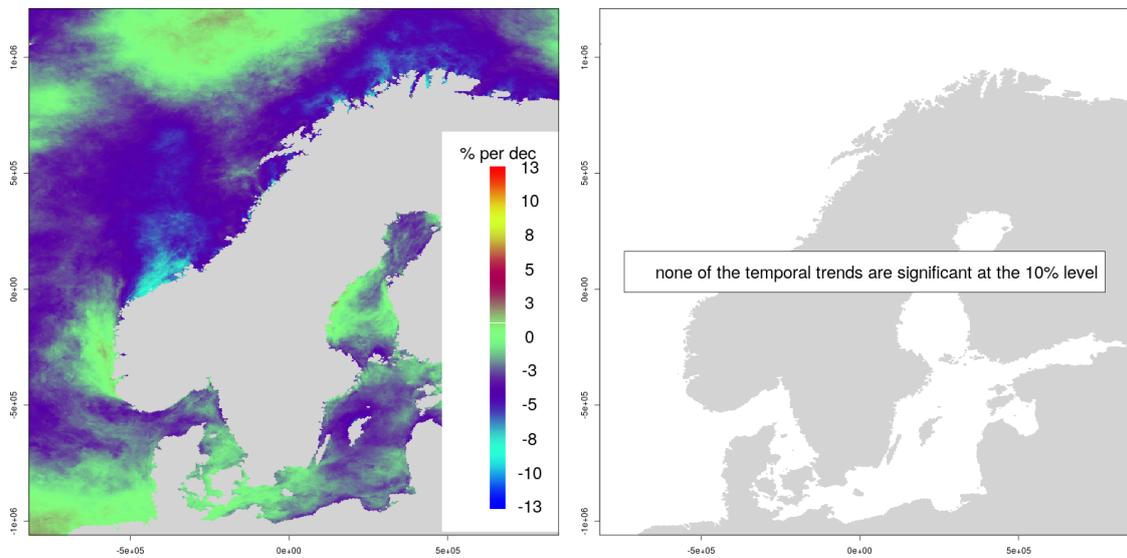


Figure 114: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of February over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

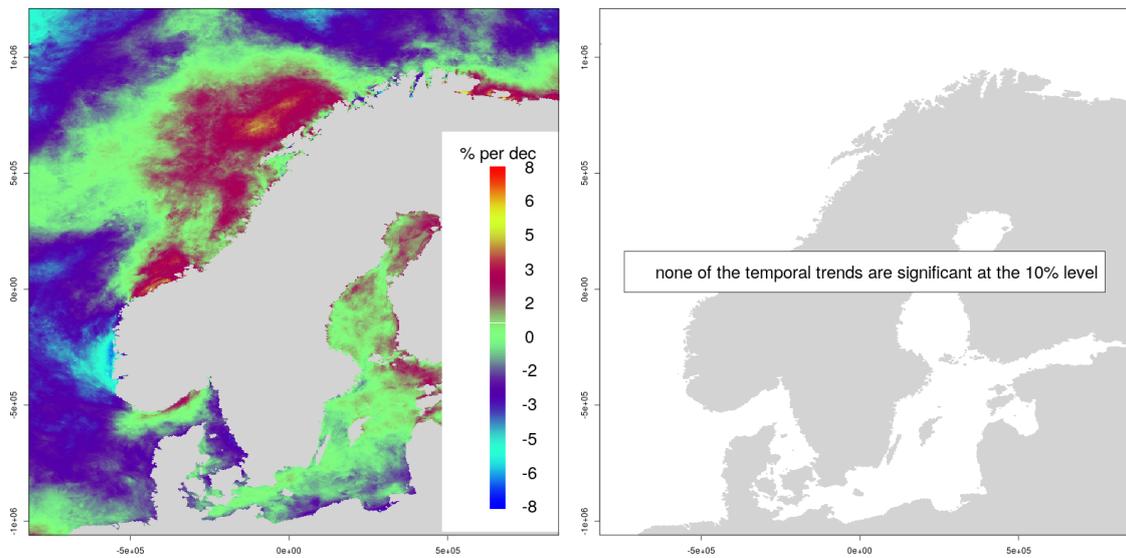


Figure 115: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of March over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

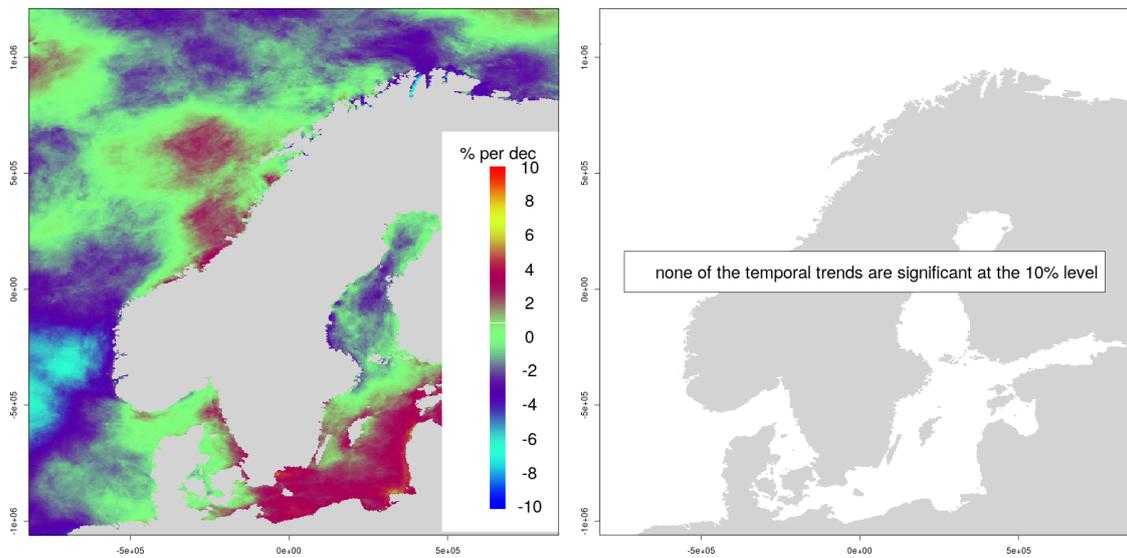


Figure 116: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of April over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

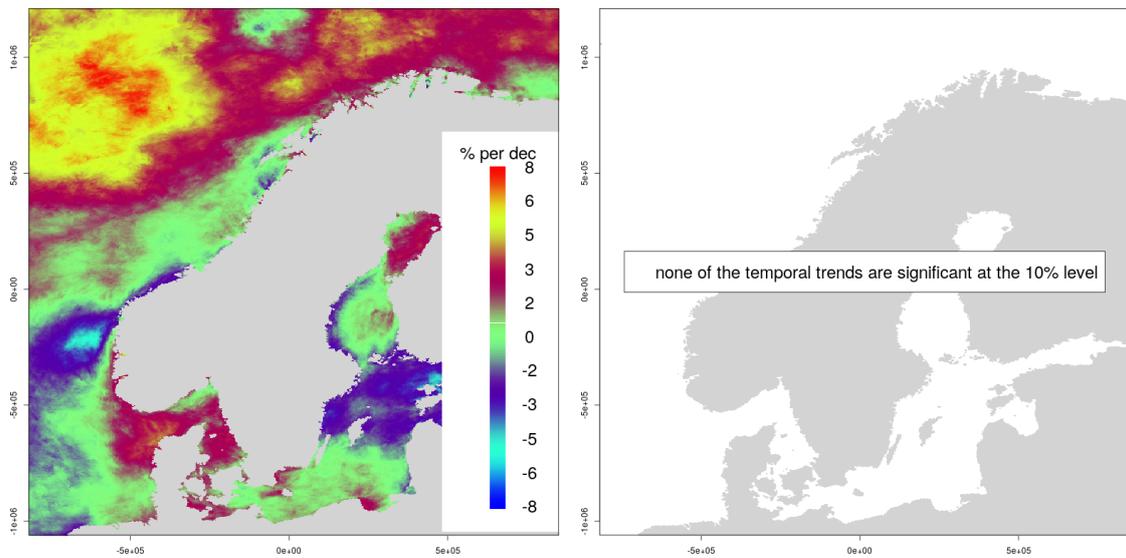


Figure 117: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of May over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

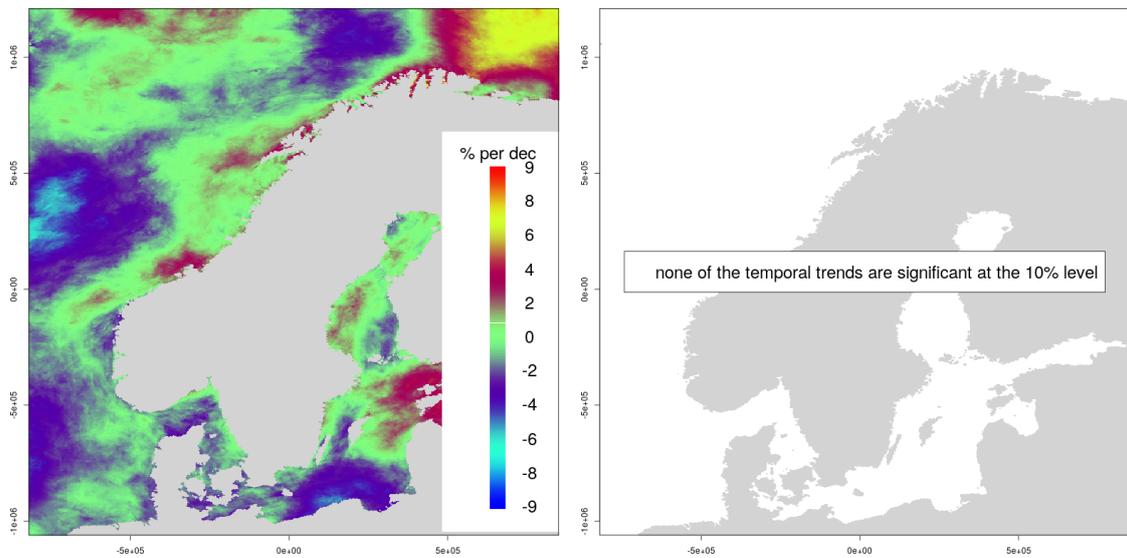


Figure 118: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of June over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

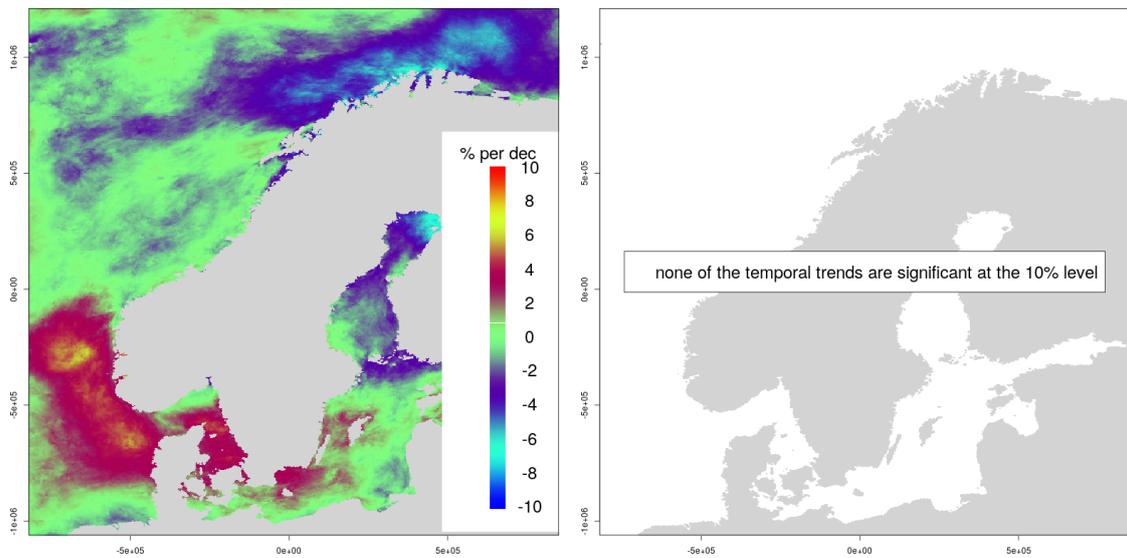


Figure 119: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of July over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

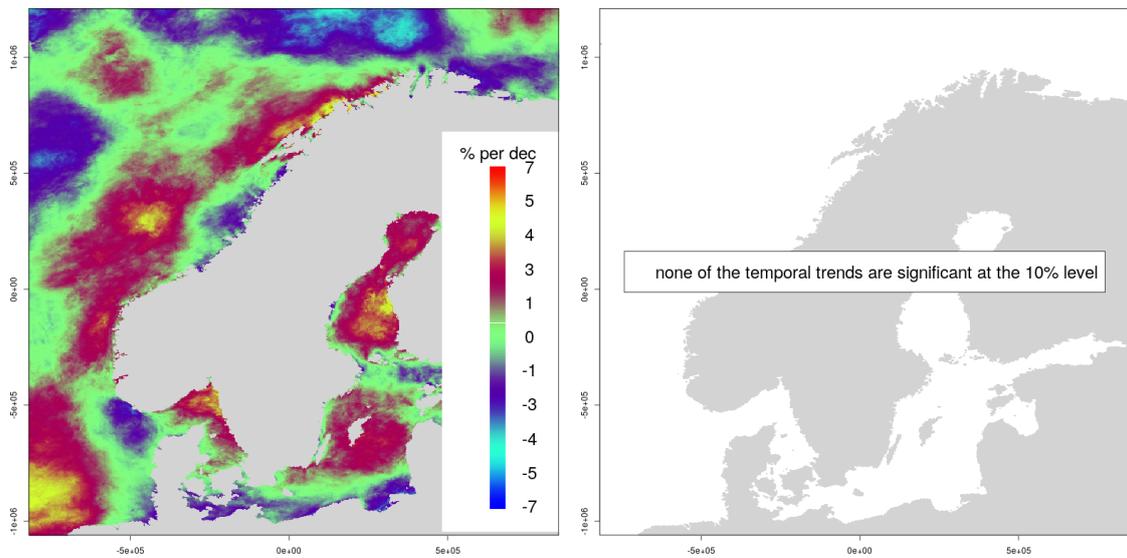


Figure 120: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of August over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

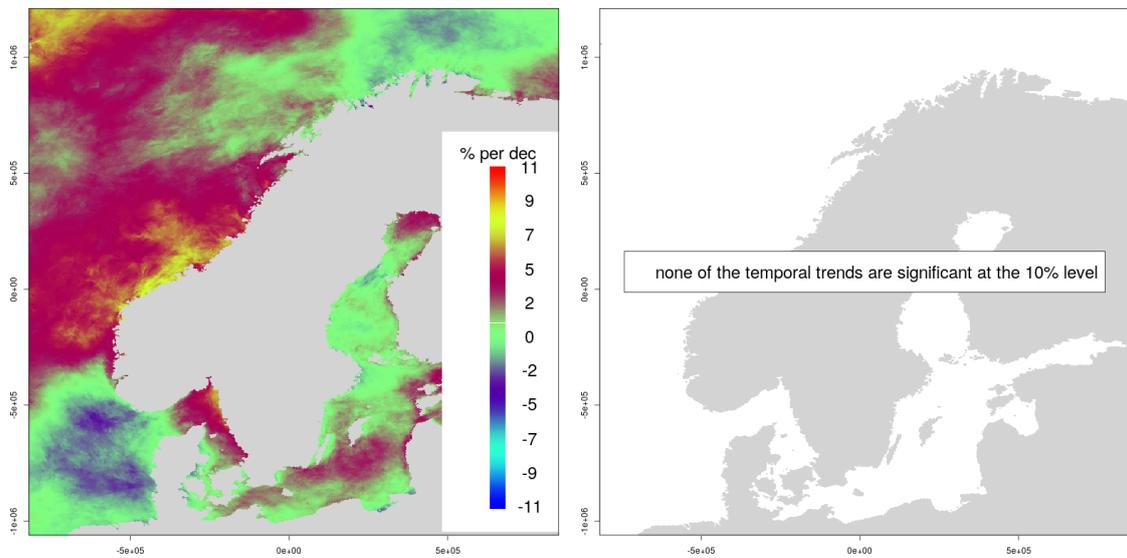


Figure 121: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of September over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

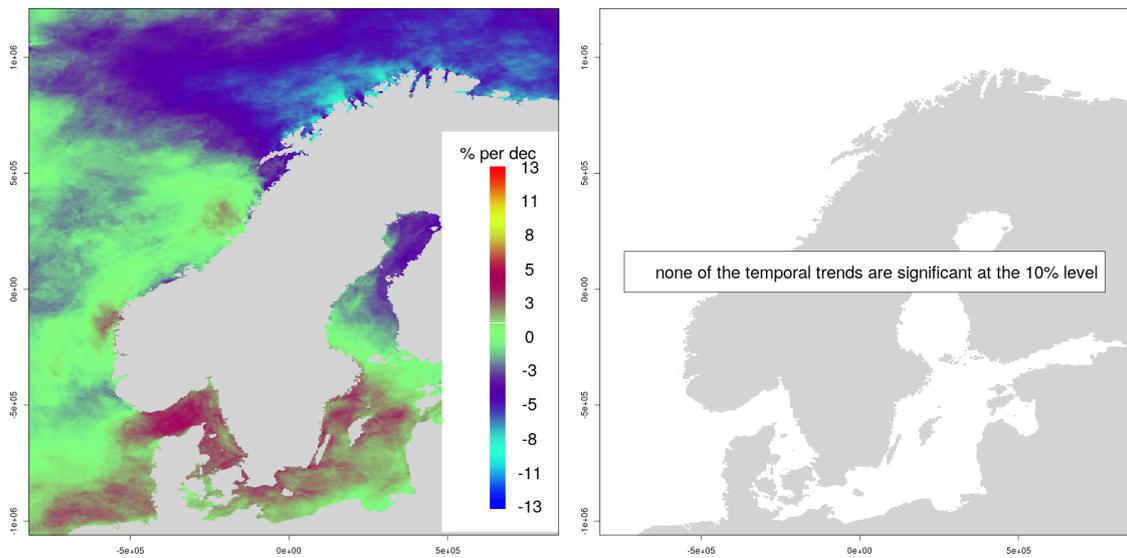


Figure 122: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of October over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

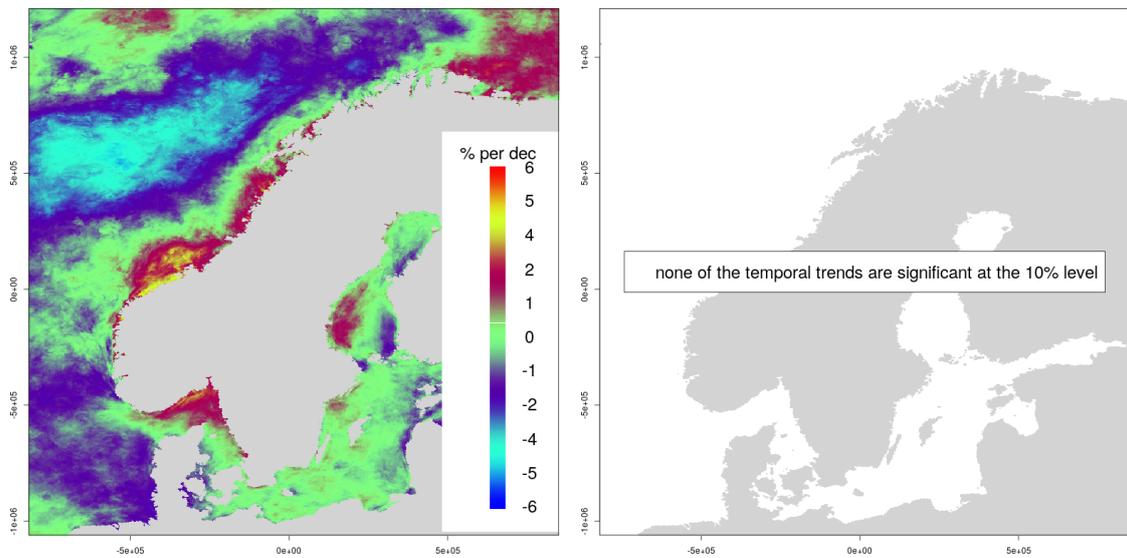


Figure 123: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of November over the period 1991-2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

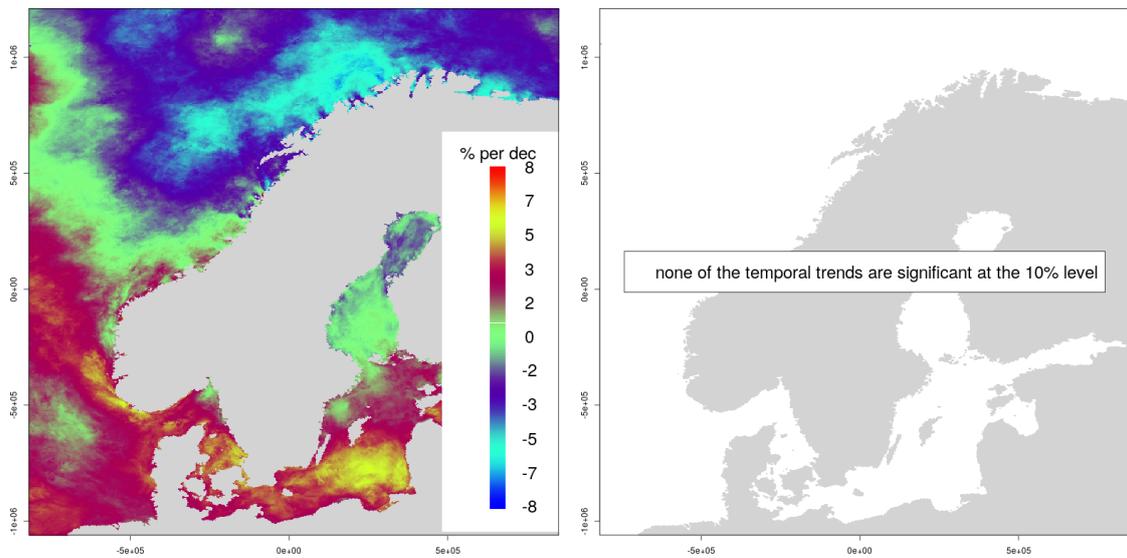


Figure 124: Normalized linear trends (in % of the climate normals per decade) of the monthly averaged 100–metre wind speed for the month of December over the period 1991–2020. At a grid point, each of the 30 monthly values used was derived from NORA3 hourly 100–metre wind speed. The left panel shows the map of the normalized trends. The right panel shows the grid points where the temporal trends are significant at the 10% level.

References