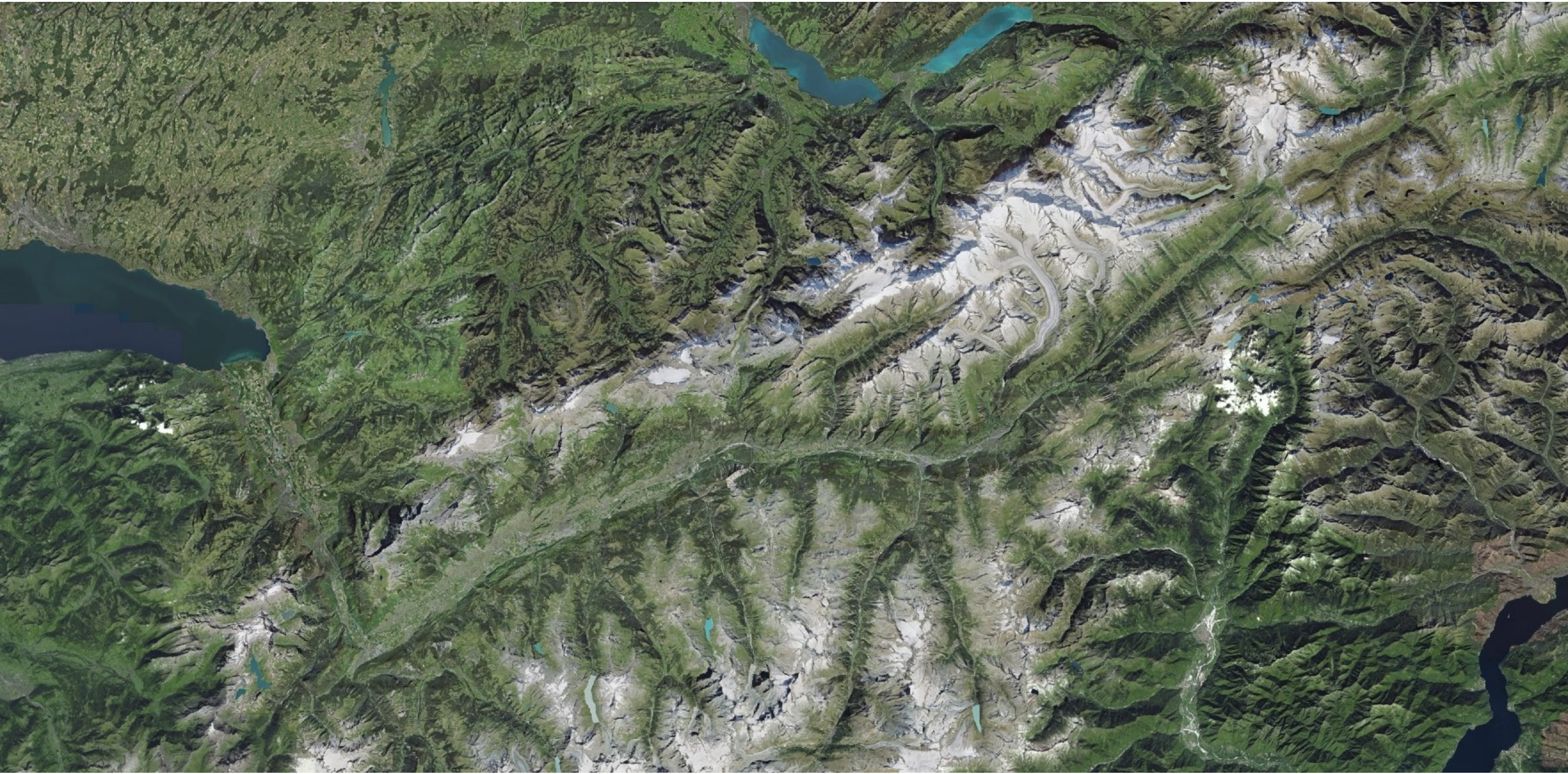
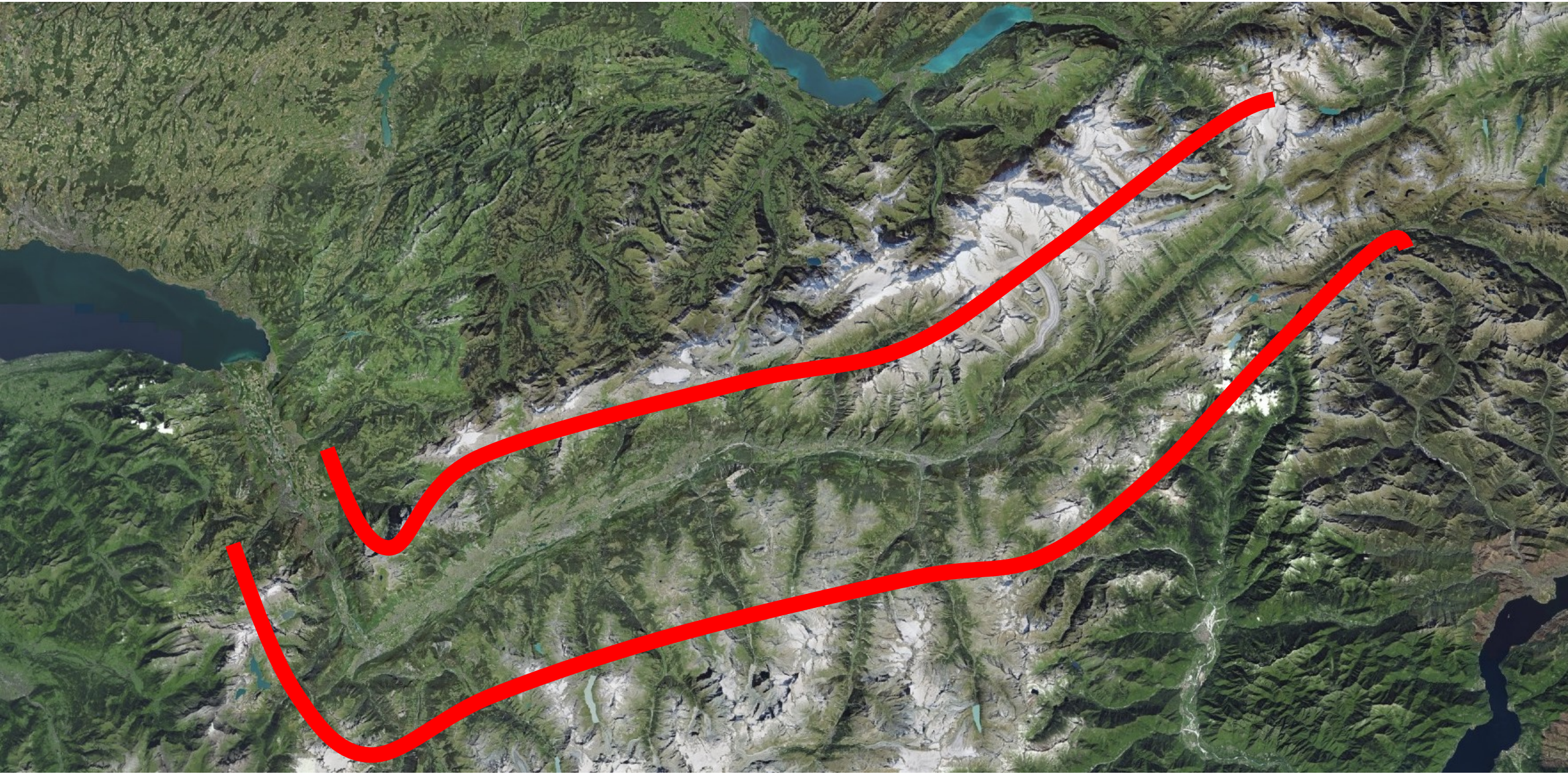


VPDrought – from Alpine Pumping to Climatic Canopy Gradients

Stefan Hunziker, Jonas Gisler, Marcus Schaub



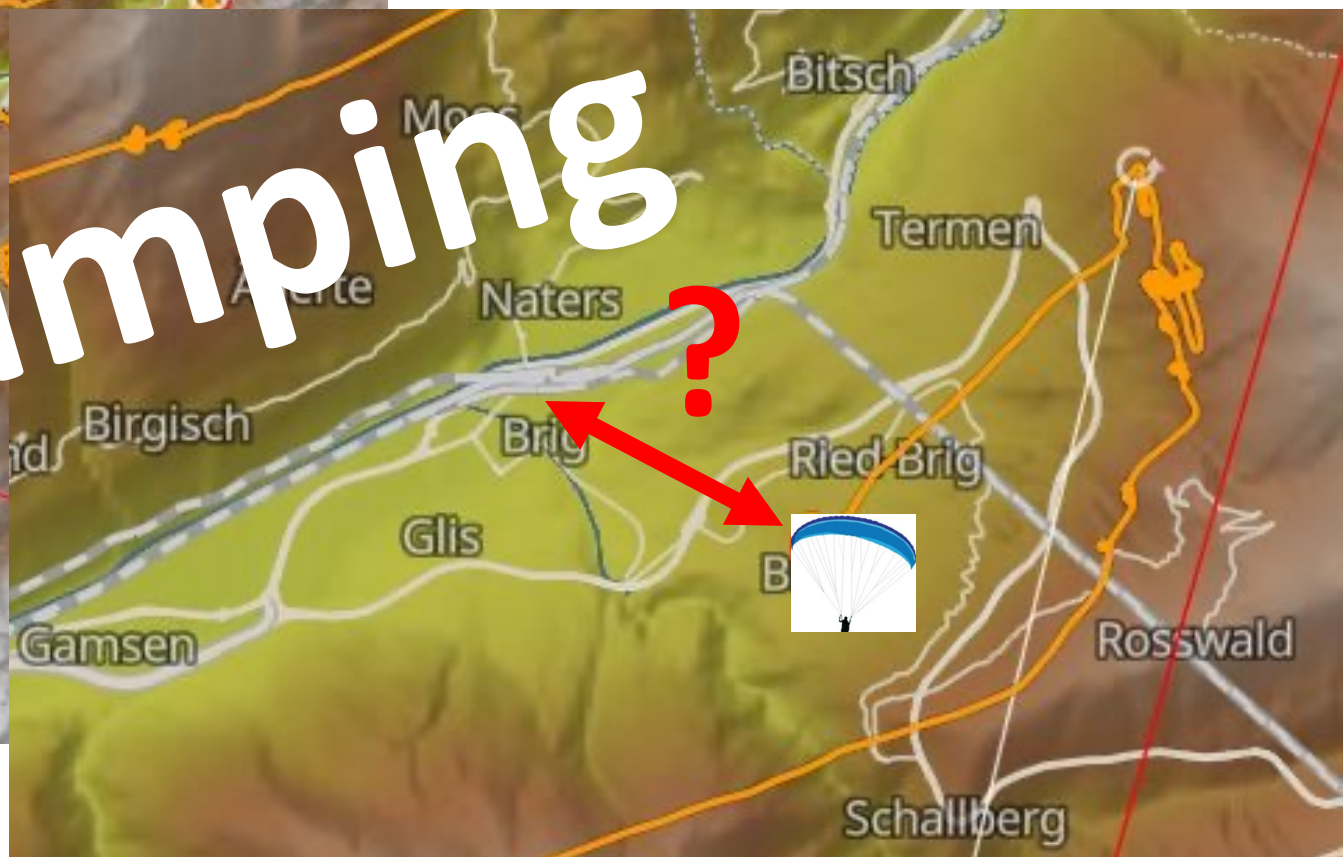
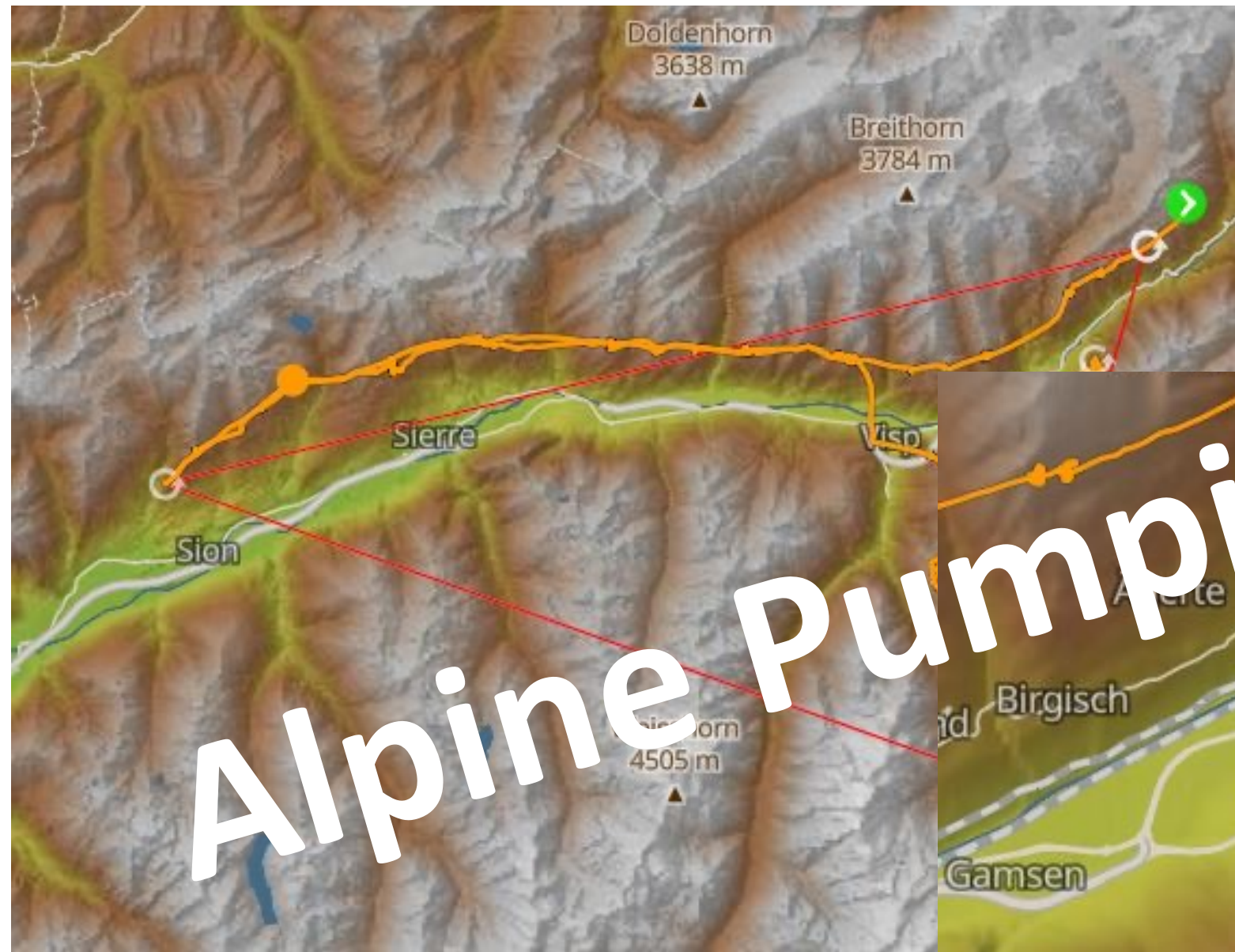






Wind

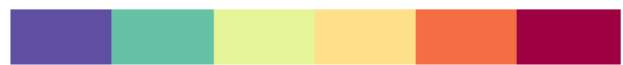
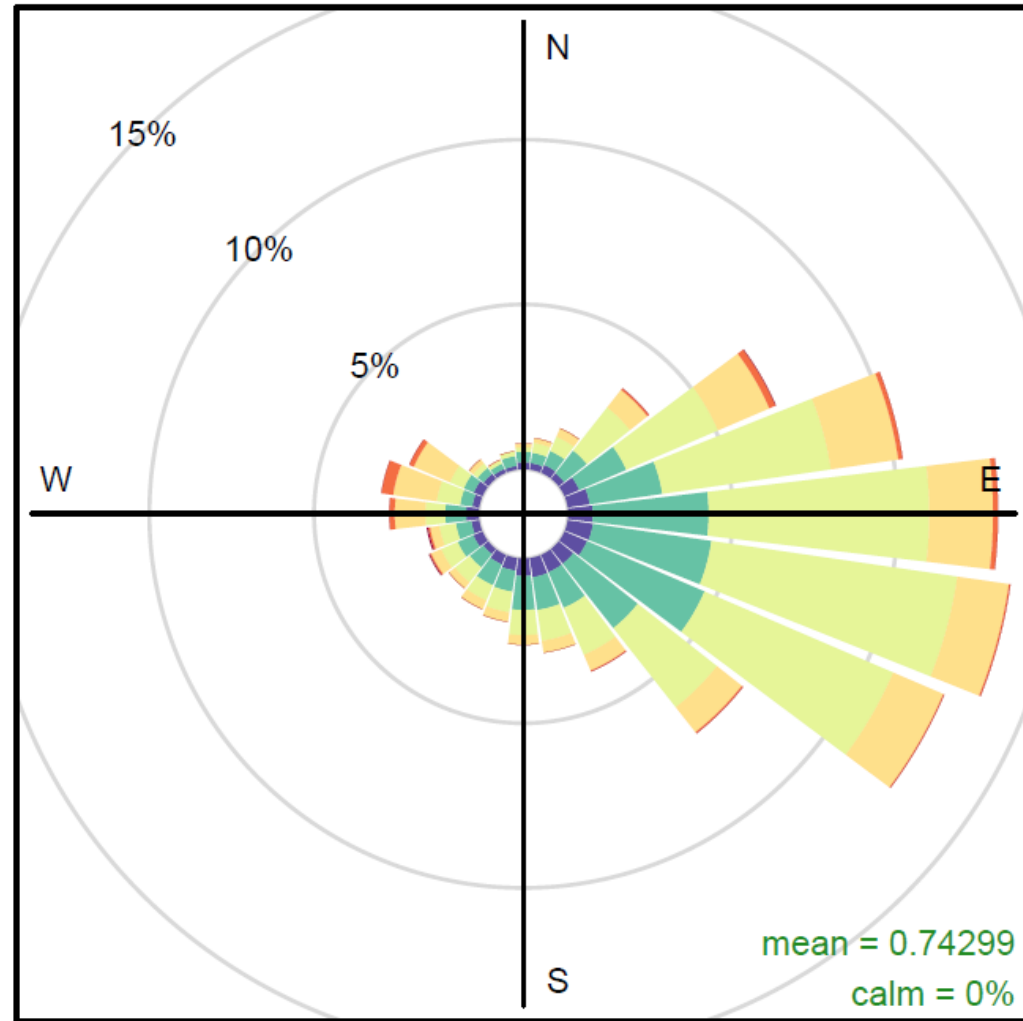
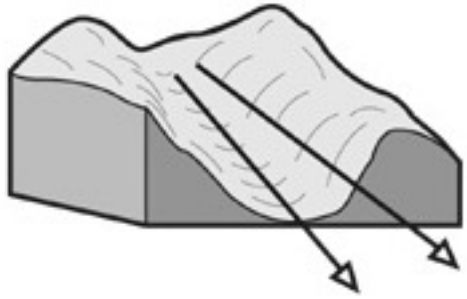
Regional wind system





© The COMET Program

Wind Pfynewald 1h Jun–Sep above canopy

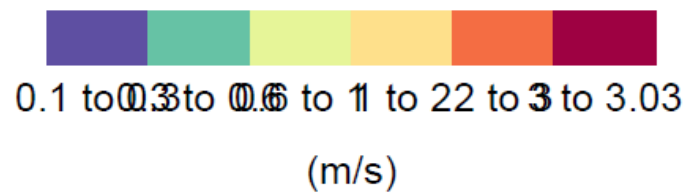
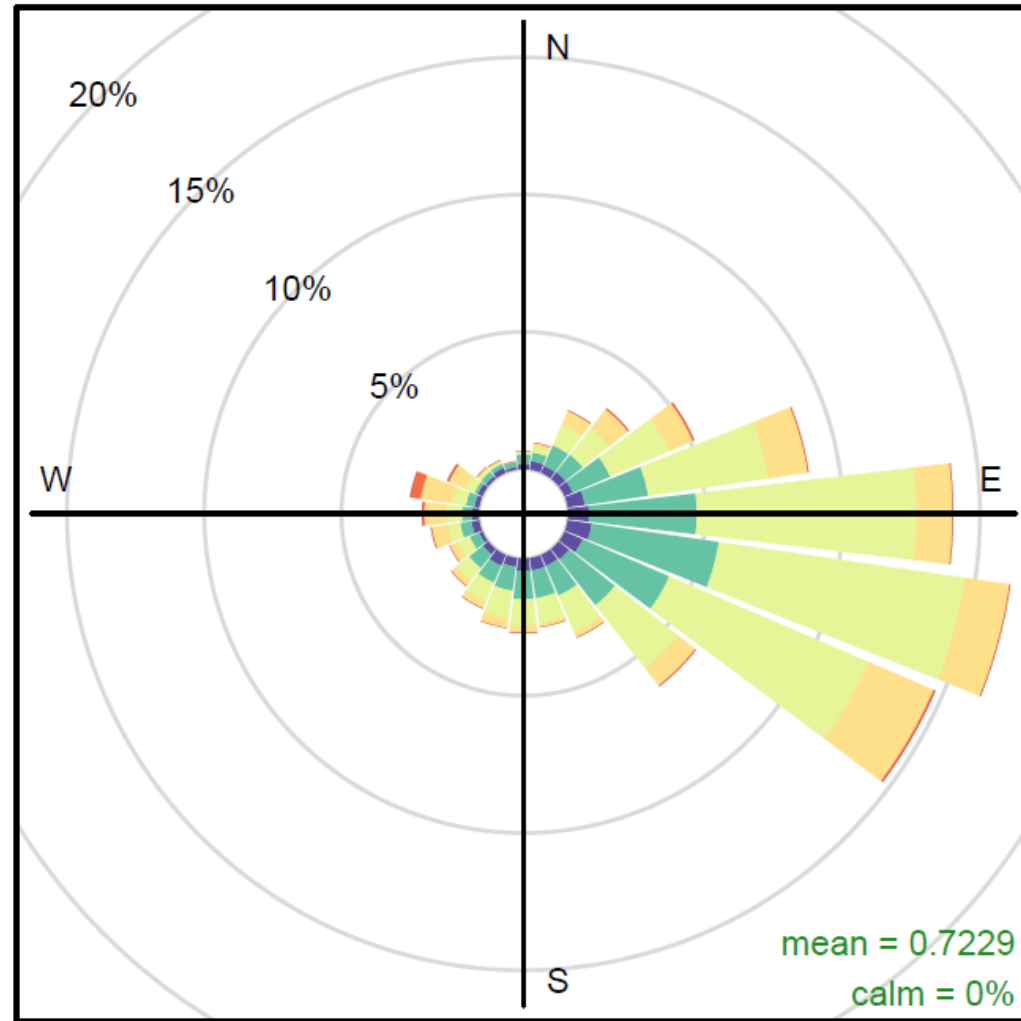
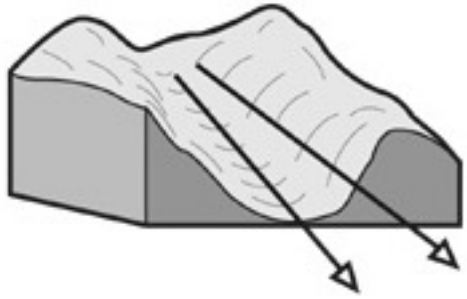


0.1 to 0.3 to 0.6 to 1 to 2 to 3 to 4.22

(m/s)

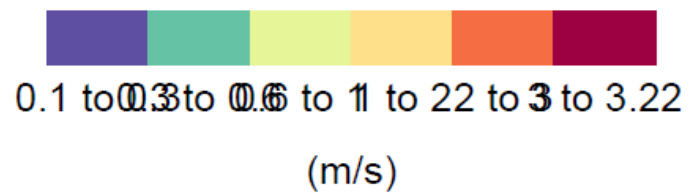
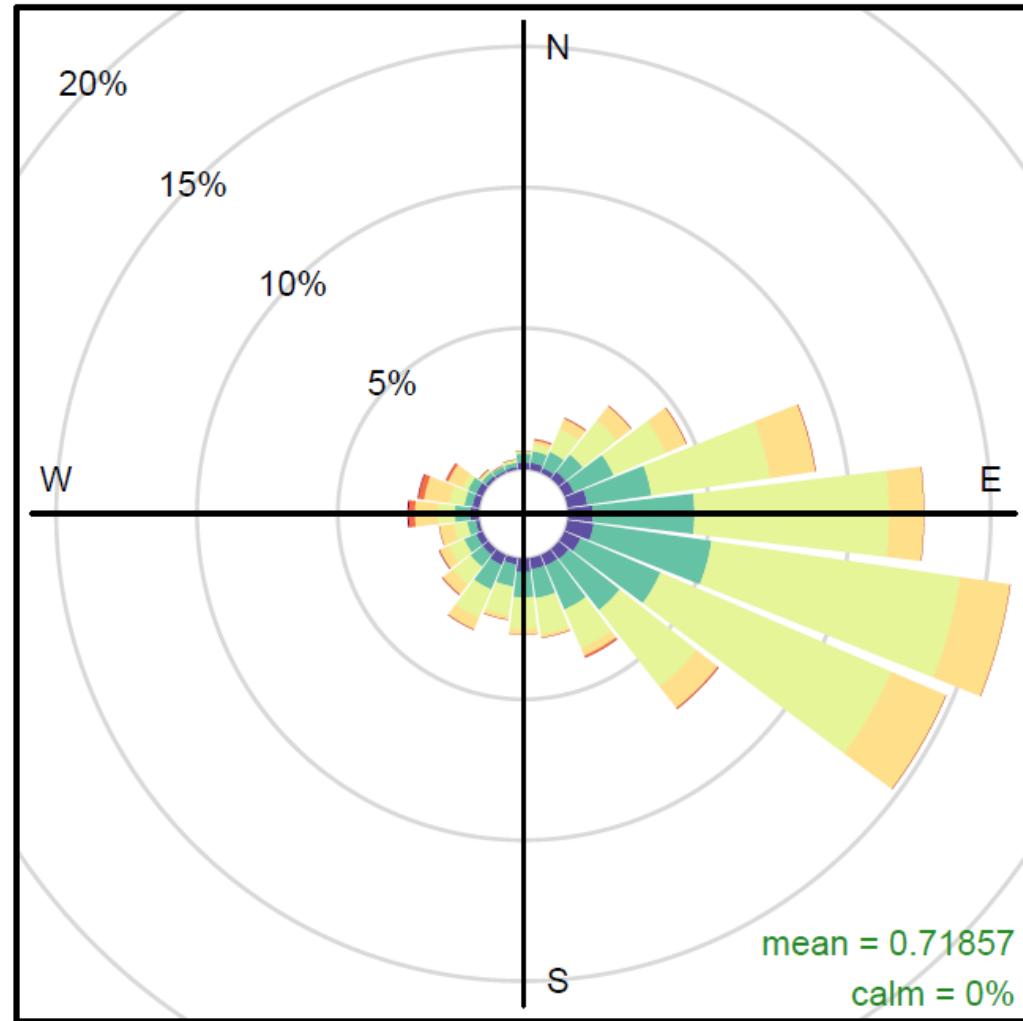
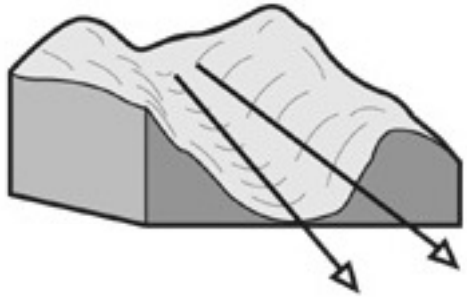
Frequency of counts by wind direction (%)

Wind Pfynewald 2h Jun-Sep above canopy



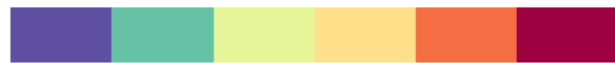
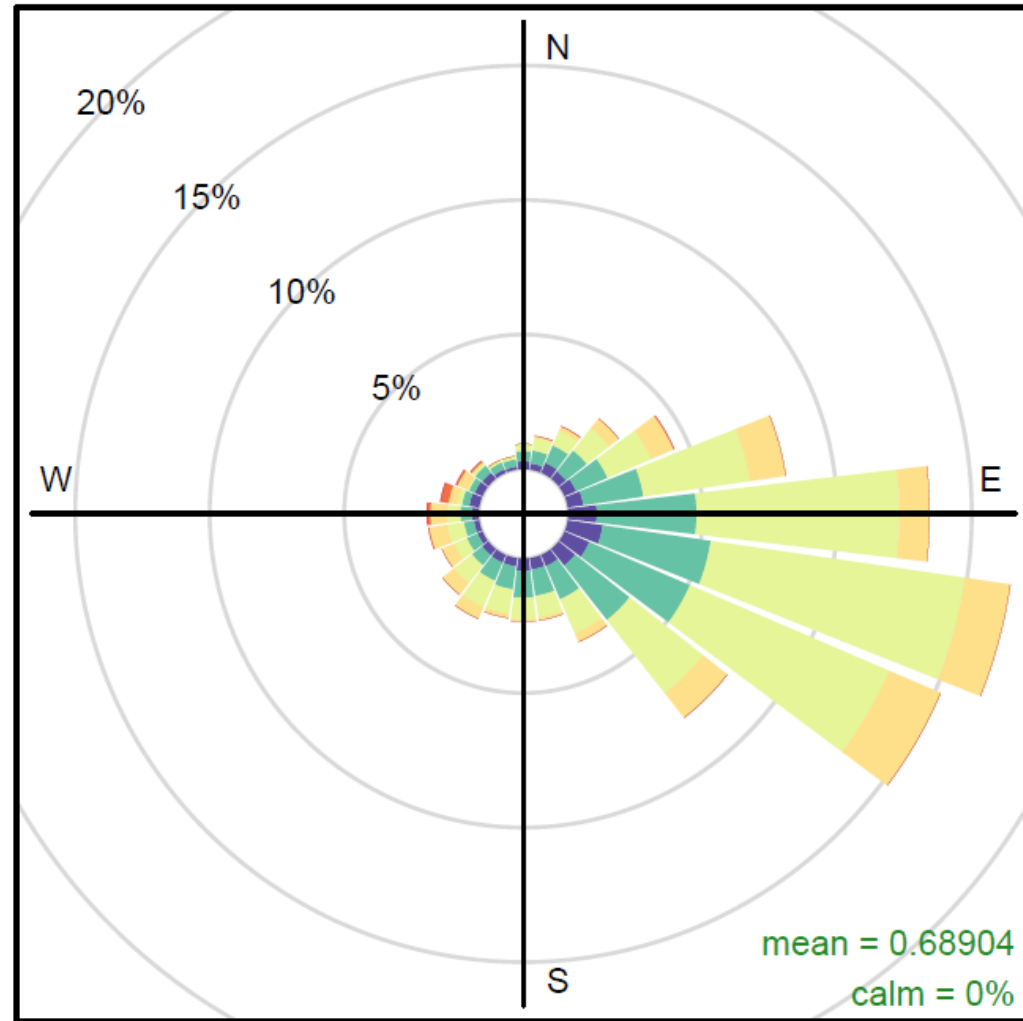
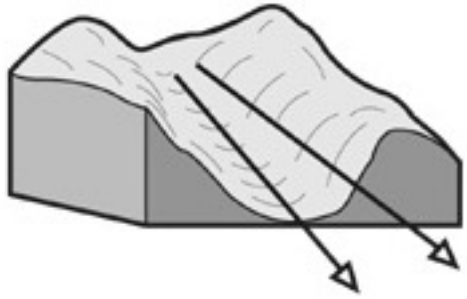
Frequency of counts by wind direction (%)

Wind Pfynewald 3h Jun–Sep above canopy



Frequency of counts by wind direction (%)

Wind Pfynewald 4h Jun–Sep above canopy

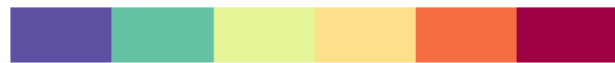
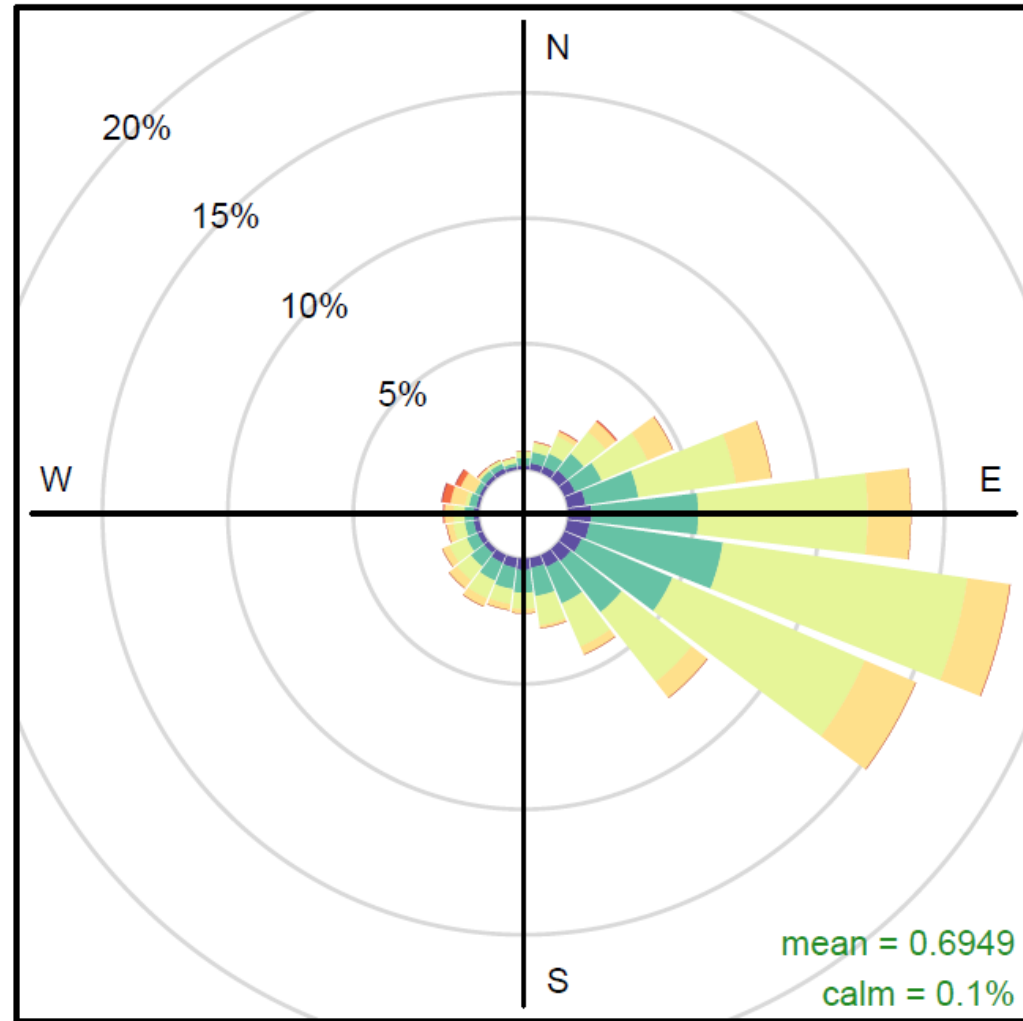
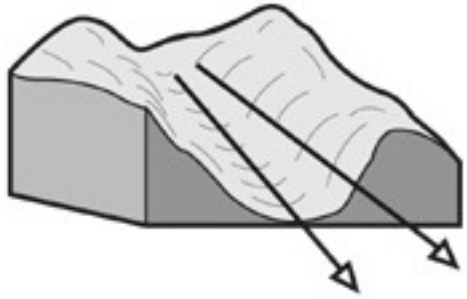


0.1 to 0.3 to 0.6 to 1 to 2 to 3 to 3.25

(m/s)

Frequency of counts by wind direction (%)

Wind Pfywald 5h Jun–Sep above canopy

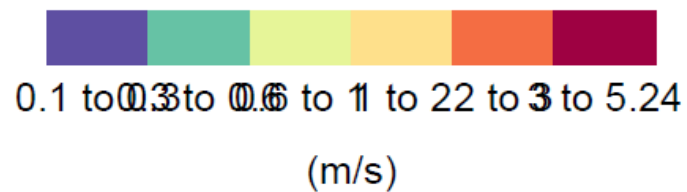
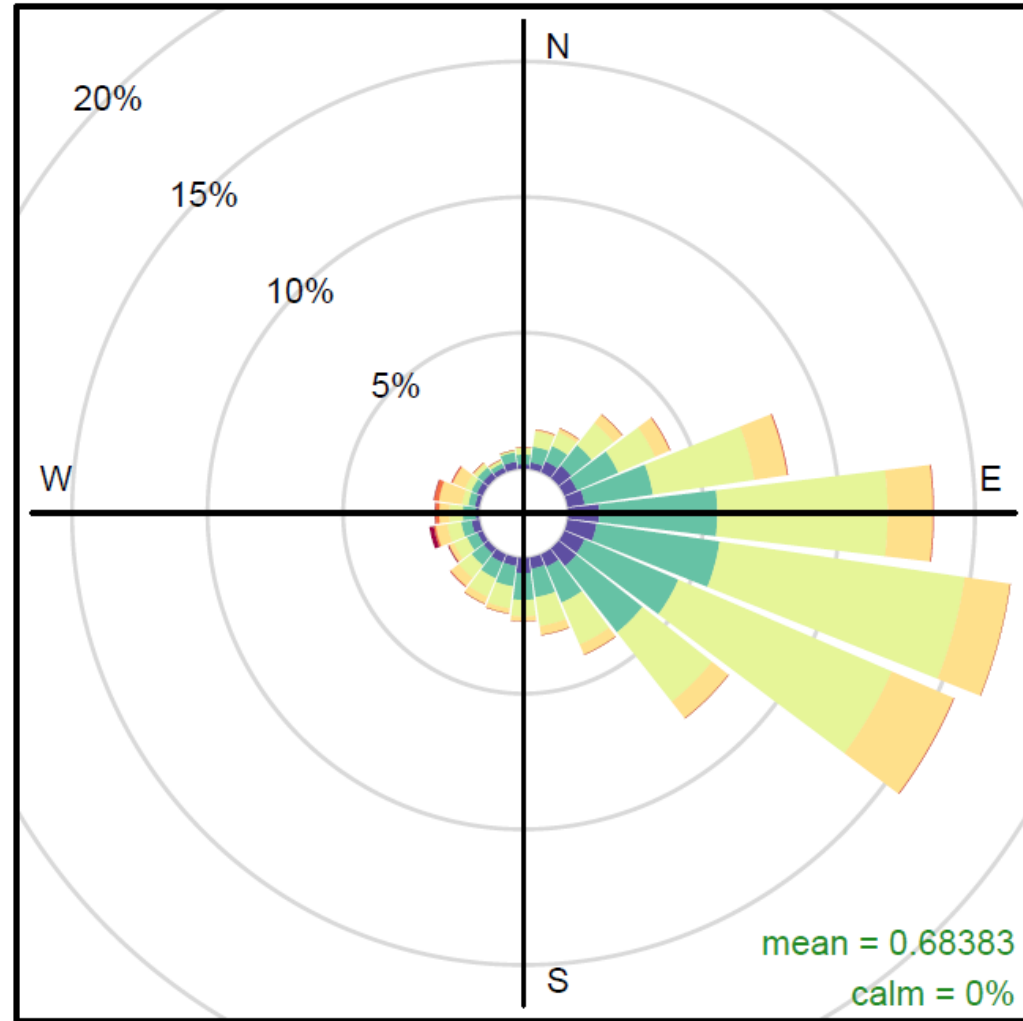
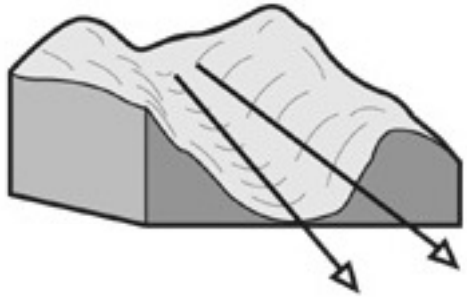


0.1 to 0.3 to 0.6 to 1 to 2 to 3 to 3.54

(m/s)

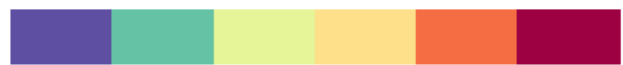
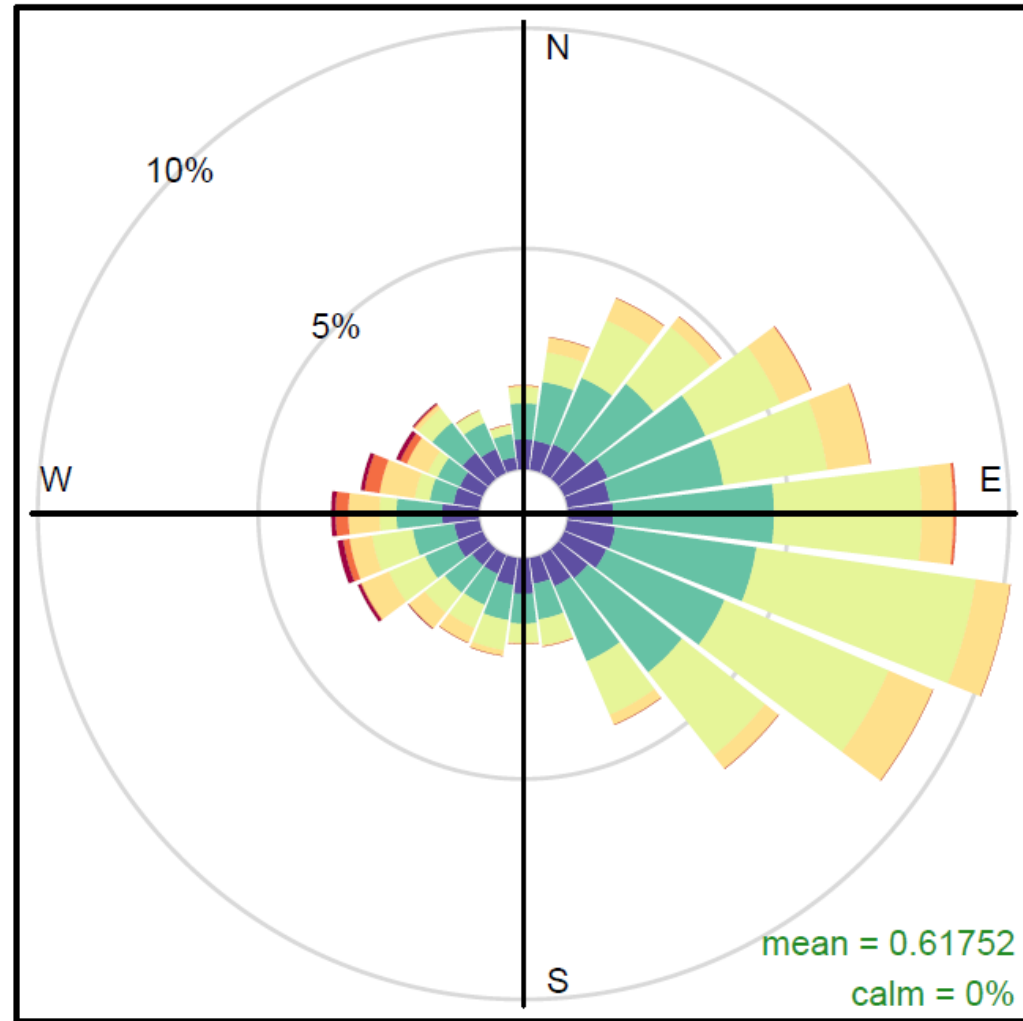
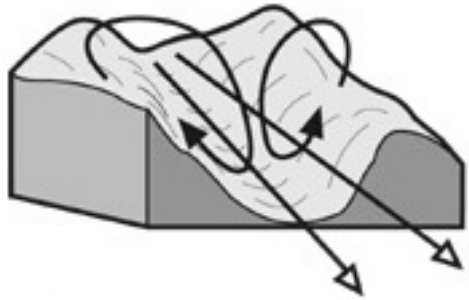
Frequency of counts by wind direction (%)

Wind Pfynewald 6h Jun-Sep above canopy



Frequency of counts by wind direction (%)

Wind Pfynewald 7h Jun-Sep above canopy

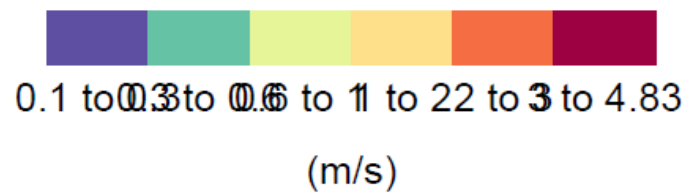
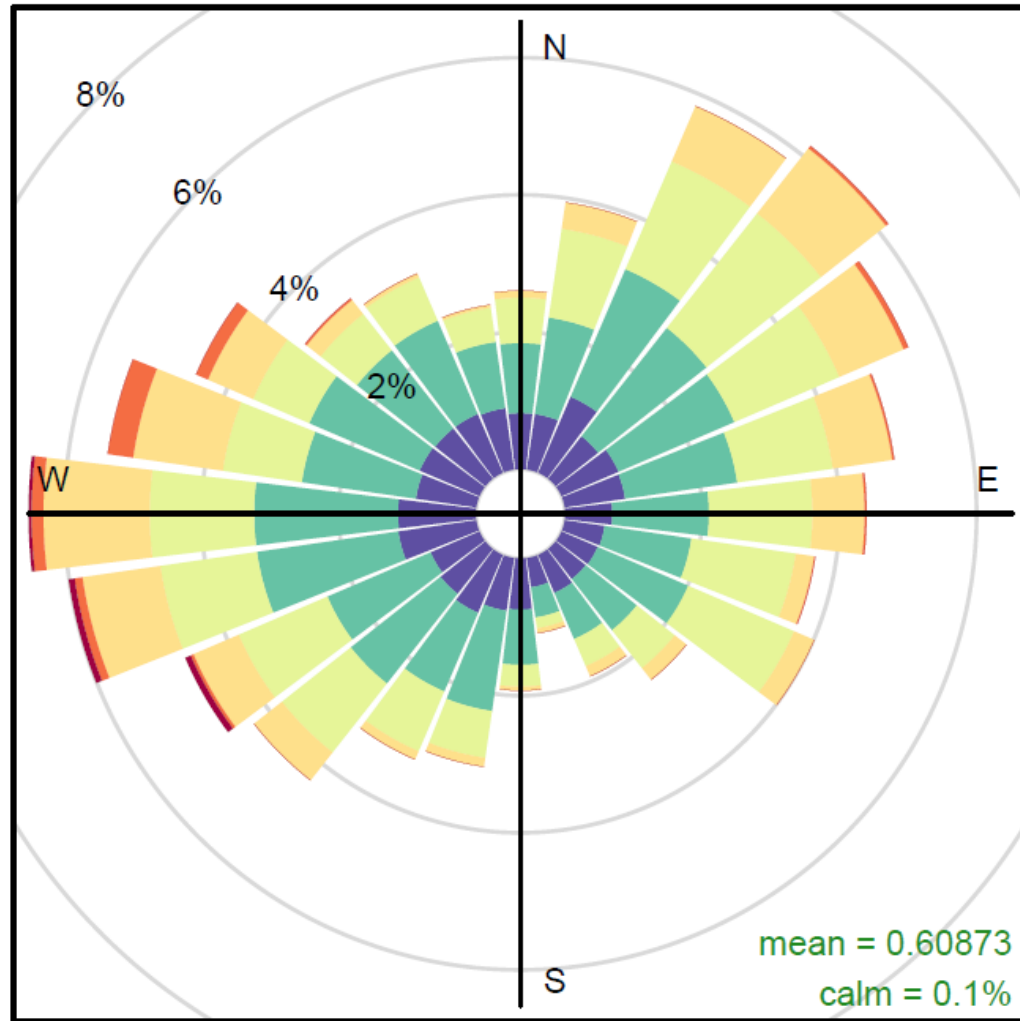


0.1 to 0.3 to 0.6 to 1 to 2 to 3 to 5.26

(m/s)

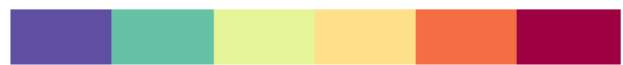
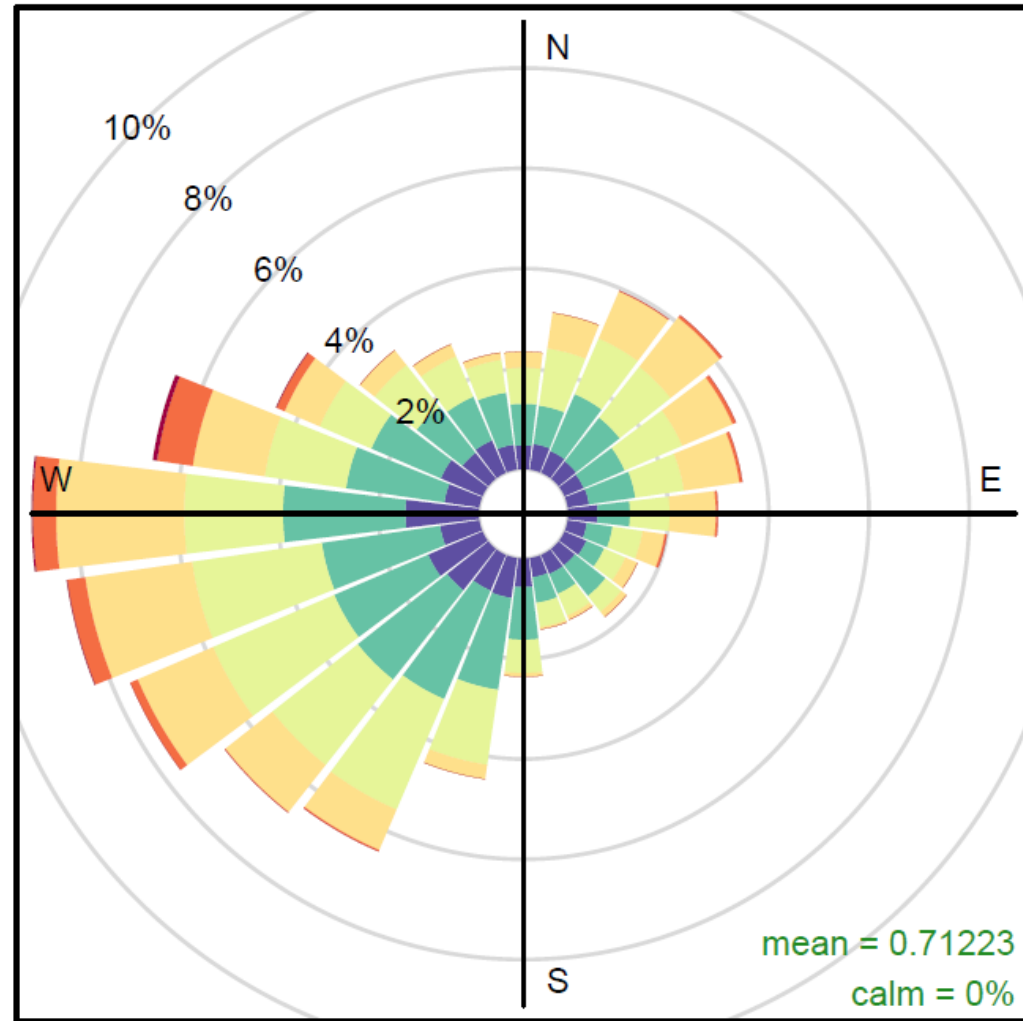
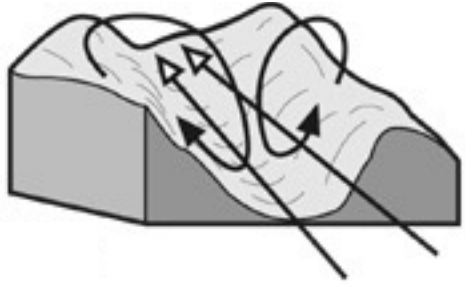
Frequency of counts by wind direction (%)

Wind Pfynewald 8h Jun–Sep above canopy



Frequency of counts by wind direction (%)

Wind Pfywald 9h Jun-Sep above canopy

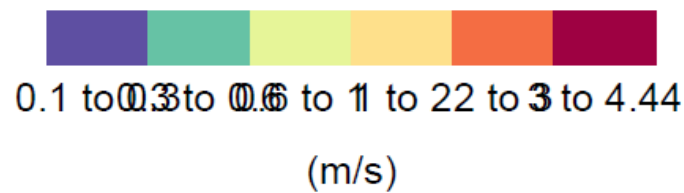
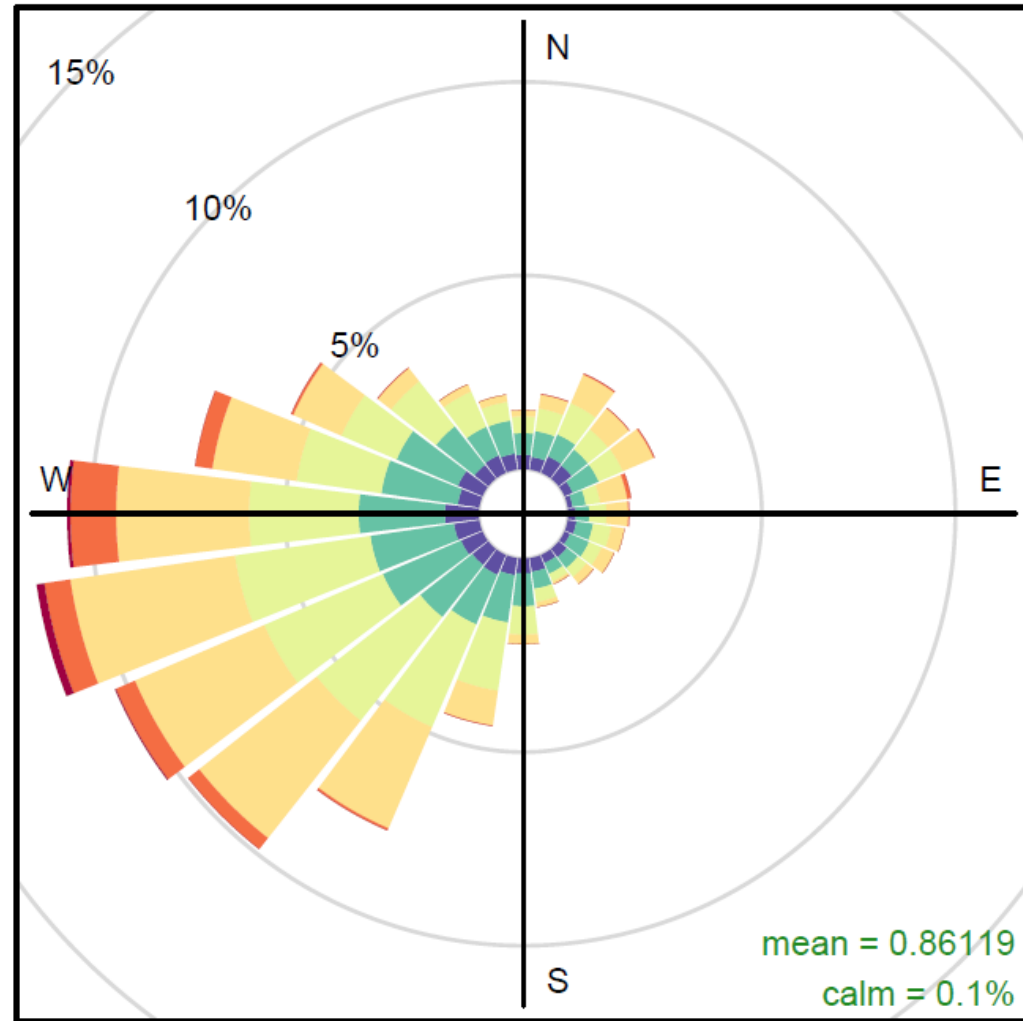
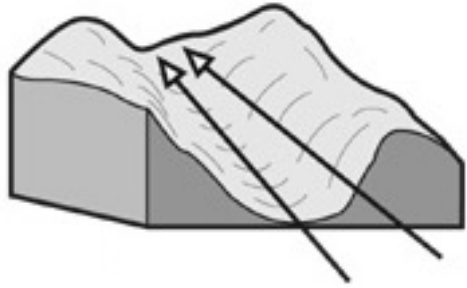


0.1 to 0.3 to 0.6 to 1 to 2 to 3 to 3.54

(m/s)

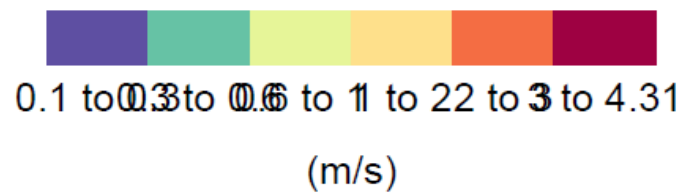
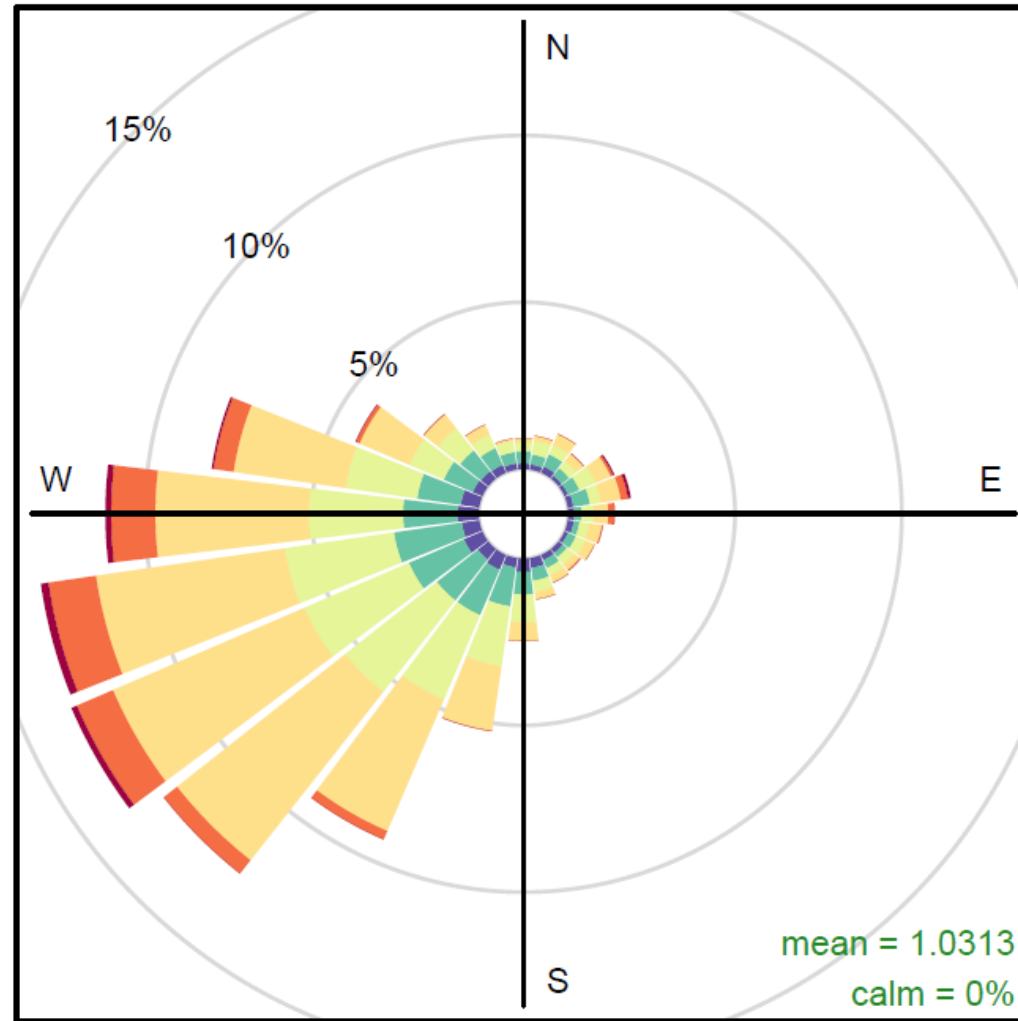
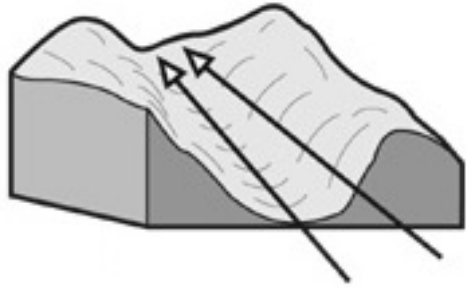
Frequency of counts by wind direction (%)

Wind Pfynewald 10h Jun–Sep above canopy



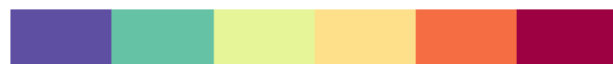
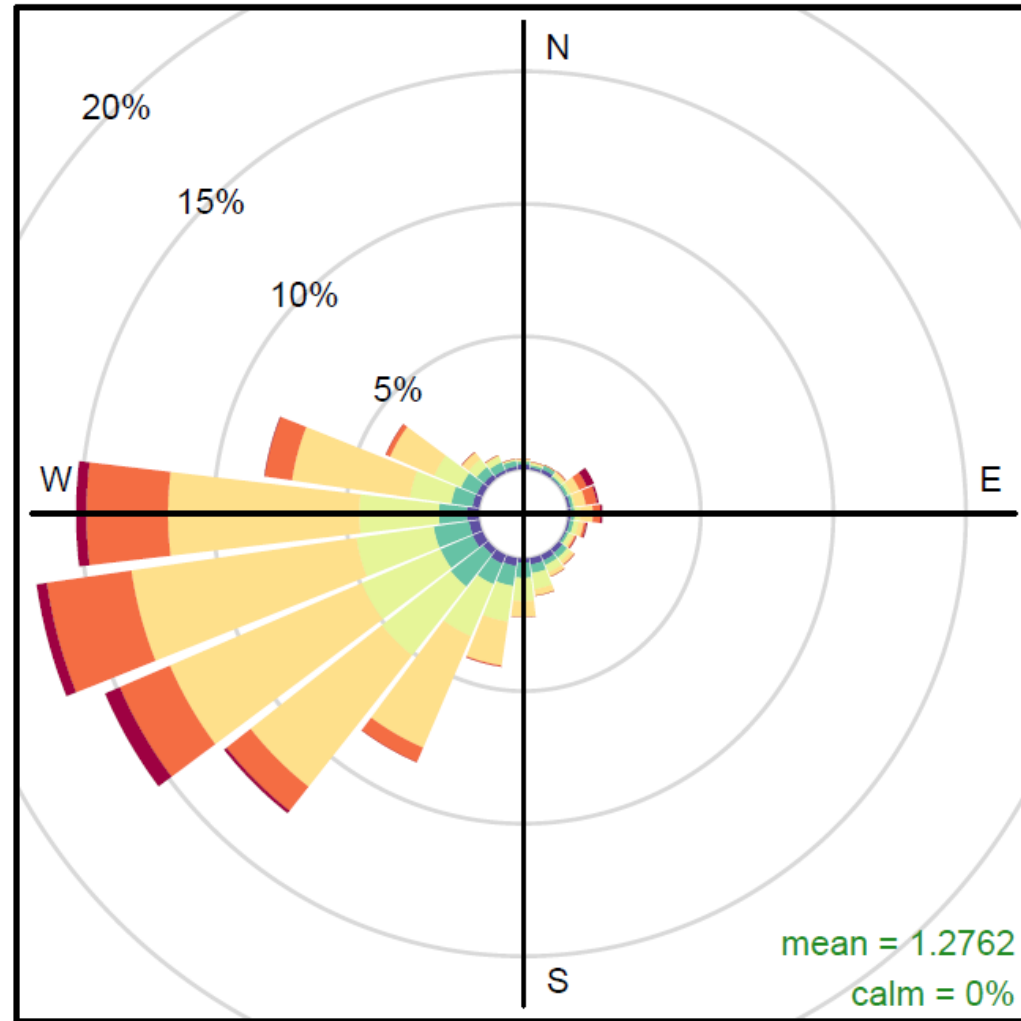
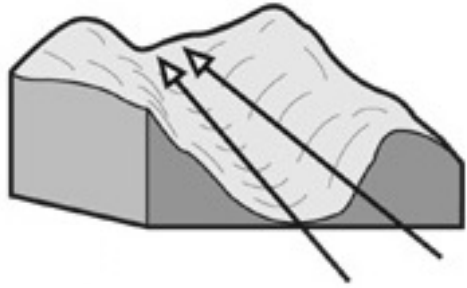
Frequency of counts by wind direction (%)

Wind Pfynewald 11h Jun–Sep above canopy



Frequency of counts by wind direction (%)

Wind Pfynewald 12h Jun–Sep above canopy

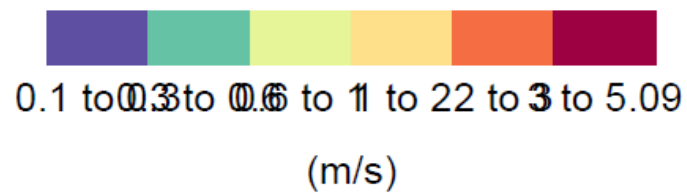
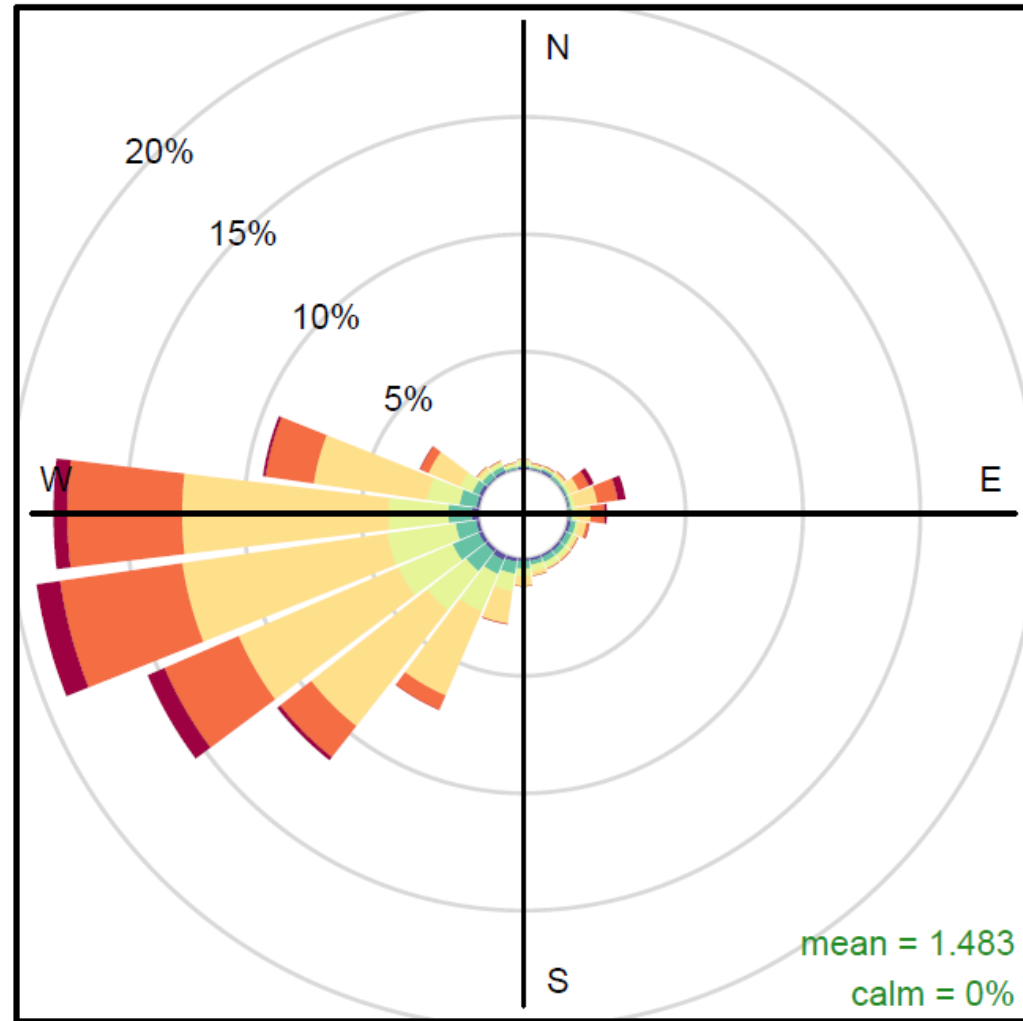
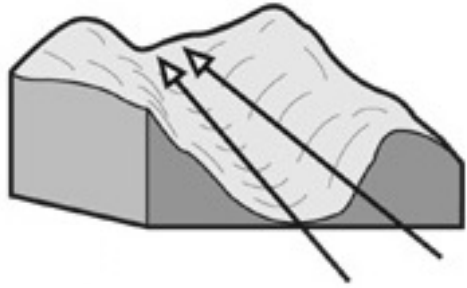


0.1 to 0.3 to 0.6 to 1 to 2 to 3 to 6.03

(m/s)

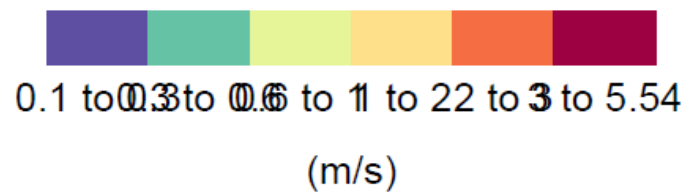
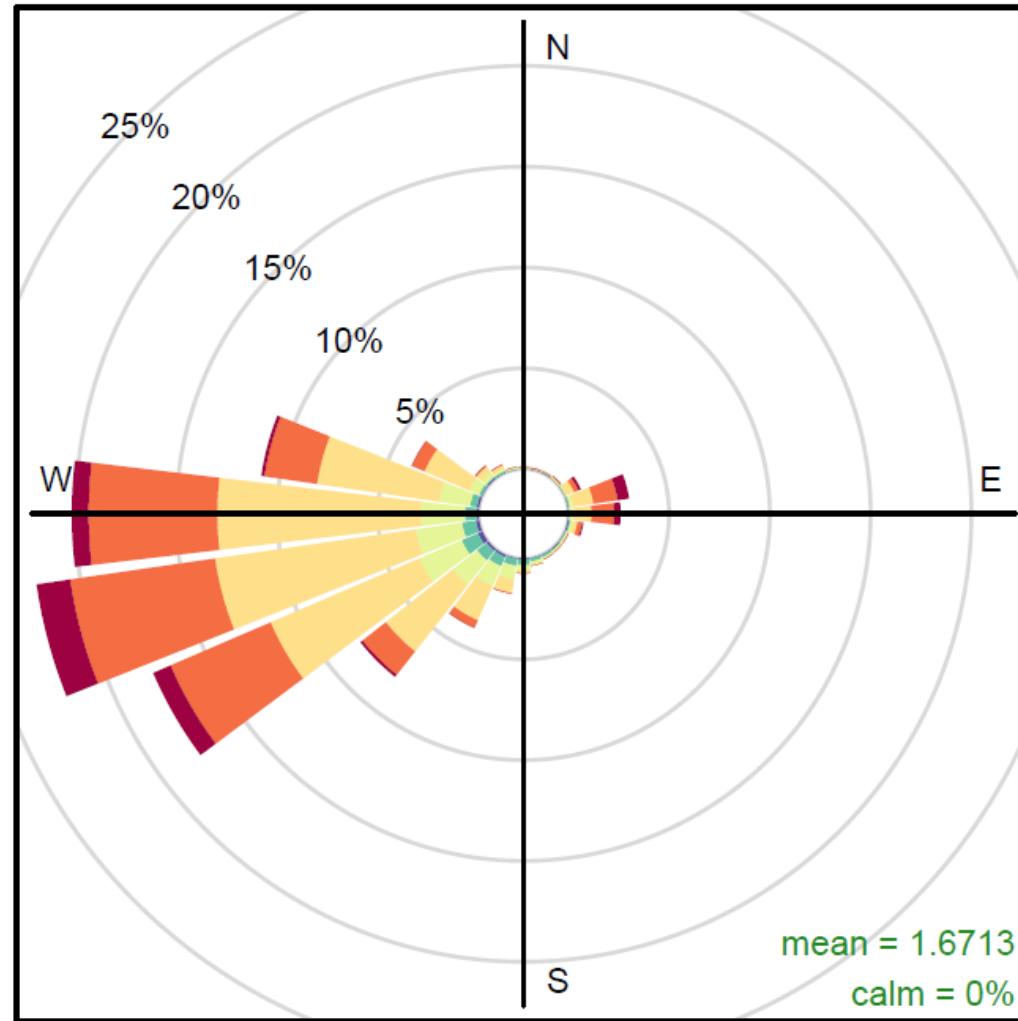
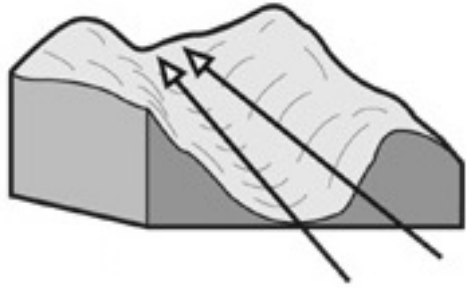
Frequency of counts by wind direction (%)

Wind Pfywald 13h Jun–Sep above canopy



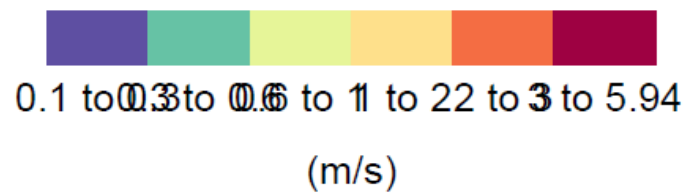
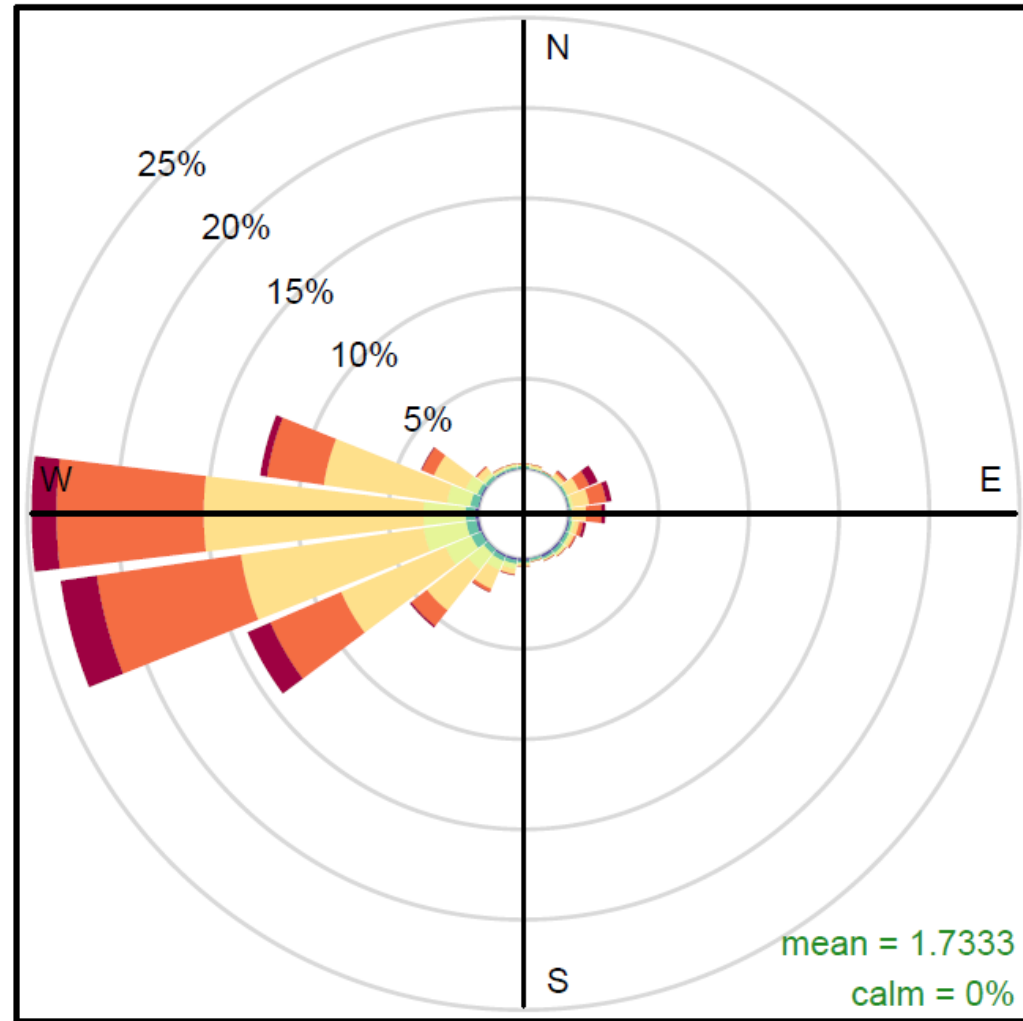
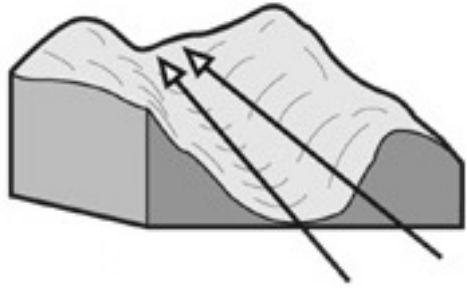
Frequency of counts by wind direction (%)

Wind Pfywald 14h Jun-Sep above canopy



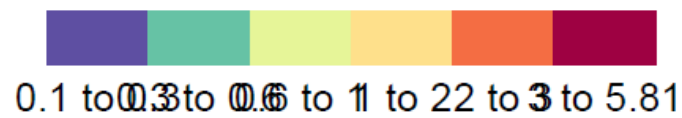
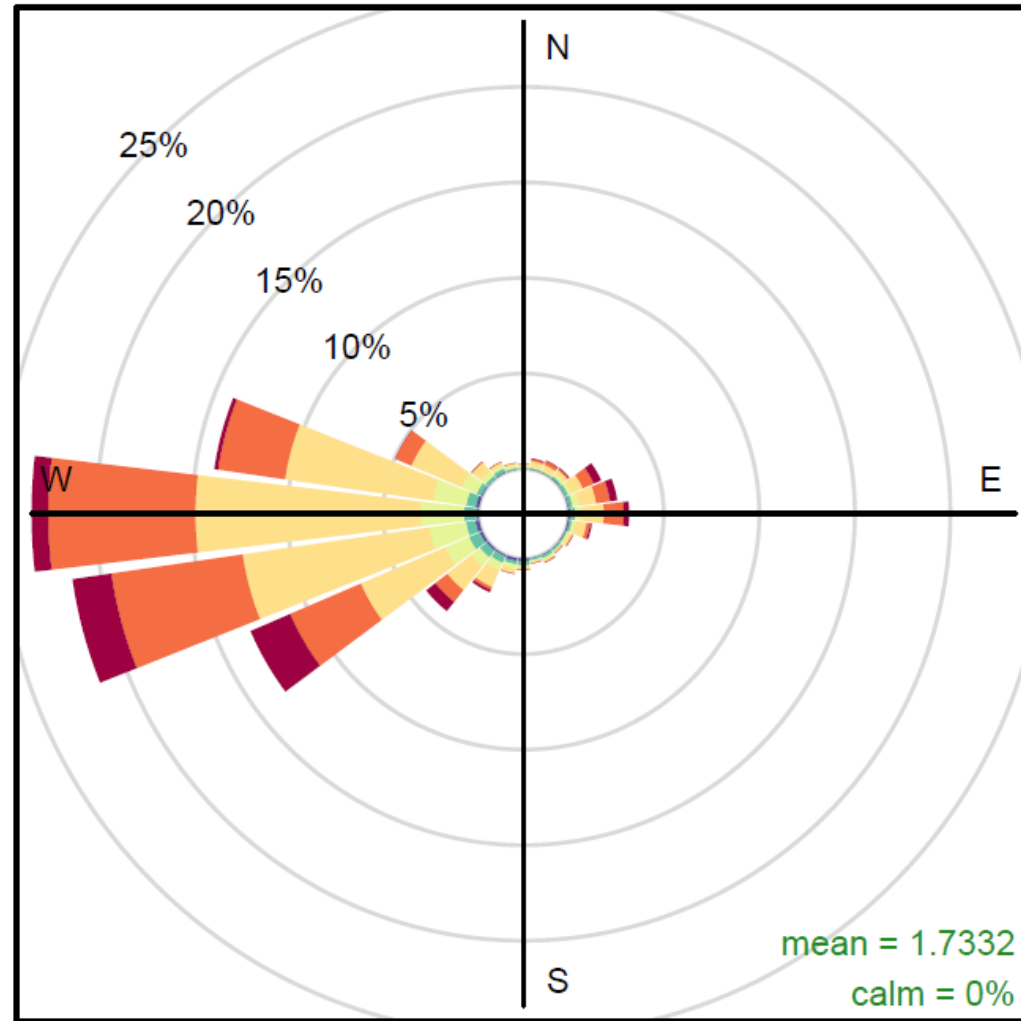
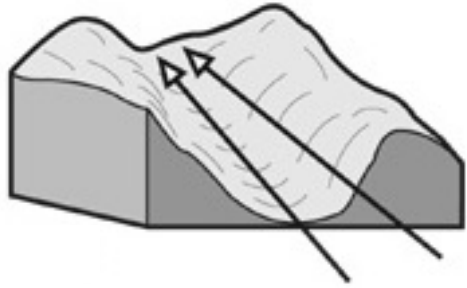
Frequency of counts by wind direction (%)

Wind Pfywald 15h Jun–Sep above canopy



Frequency of counts by wind direction (%)

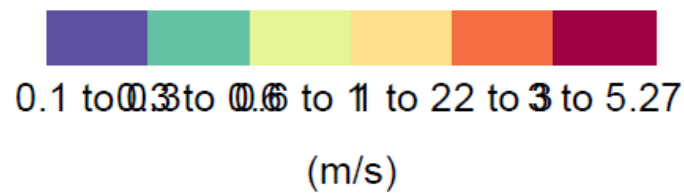
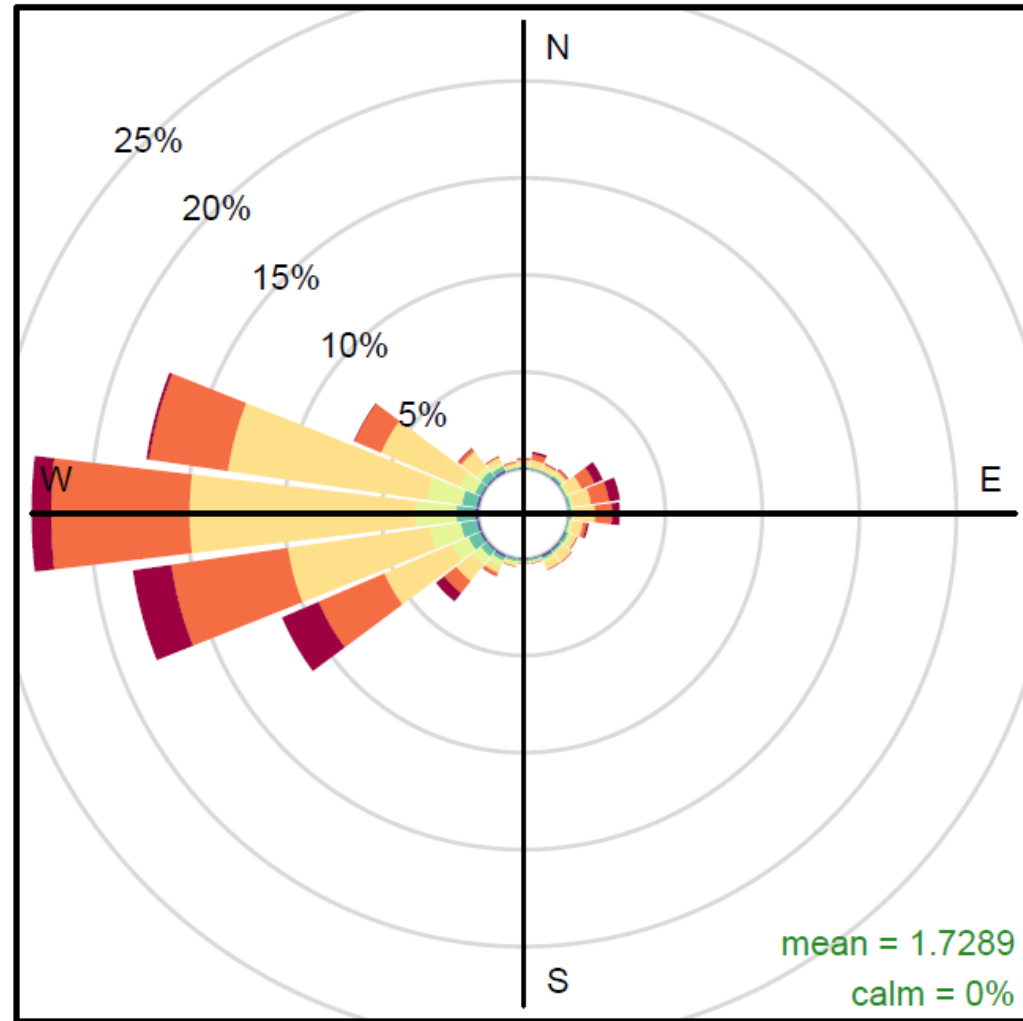
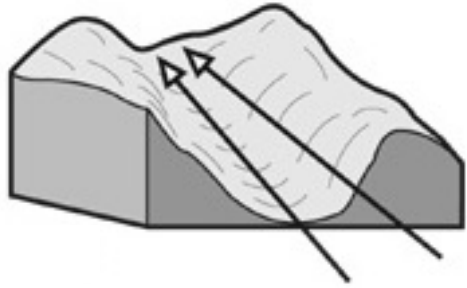
Wind Pfywald 16h Jun–Sep above canopy



(m/s)

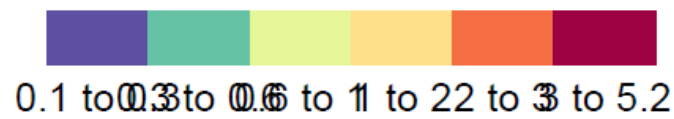
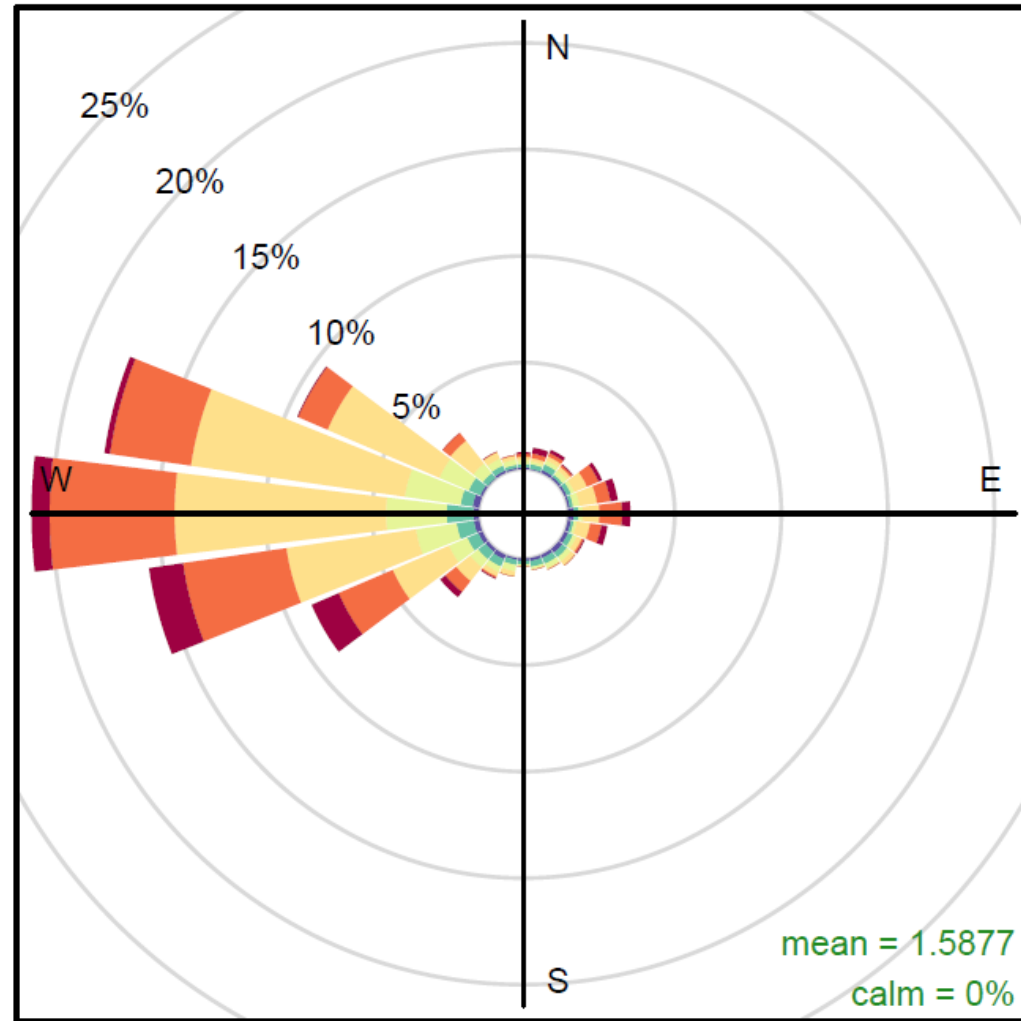
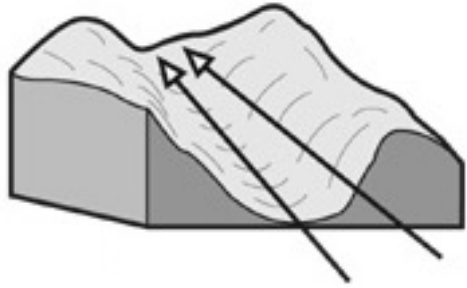
Frequency of counts by wind direction (%)

Wind Pfywald 17h Jun–Sep above canopy



Frequency of counts by wind direction (%)

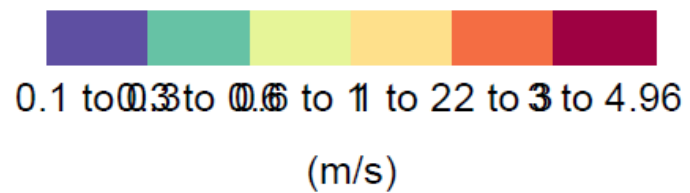
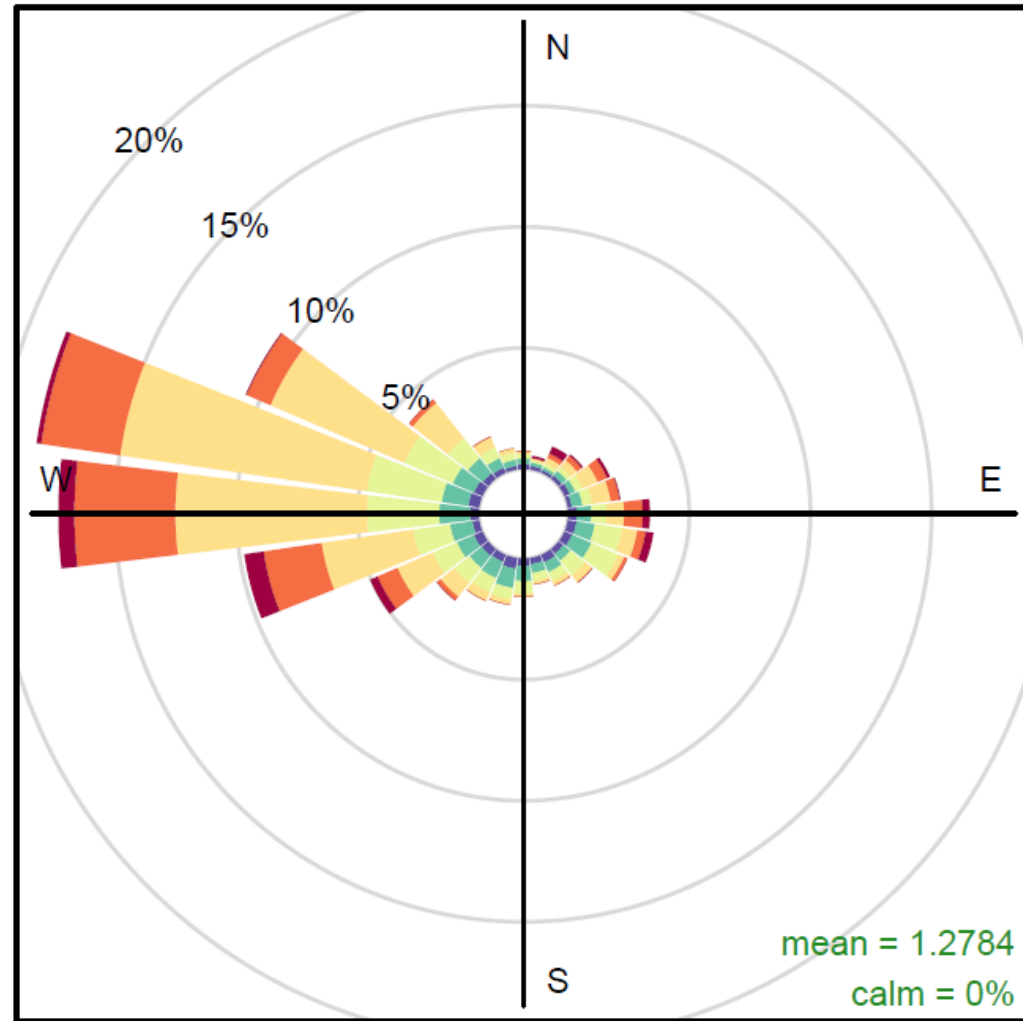
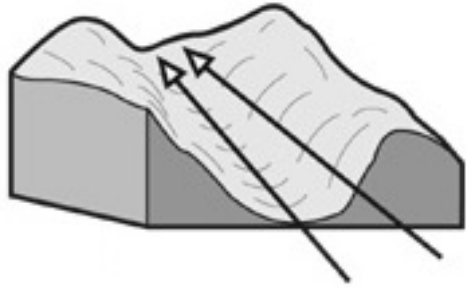
Wind Pfywald 18h Jun–Sep above canopy



(m/s)

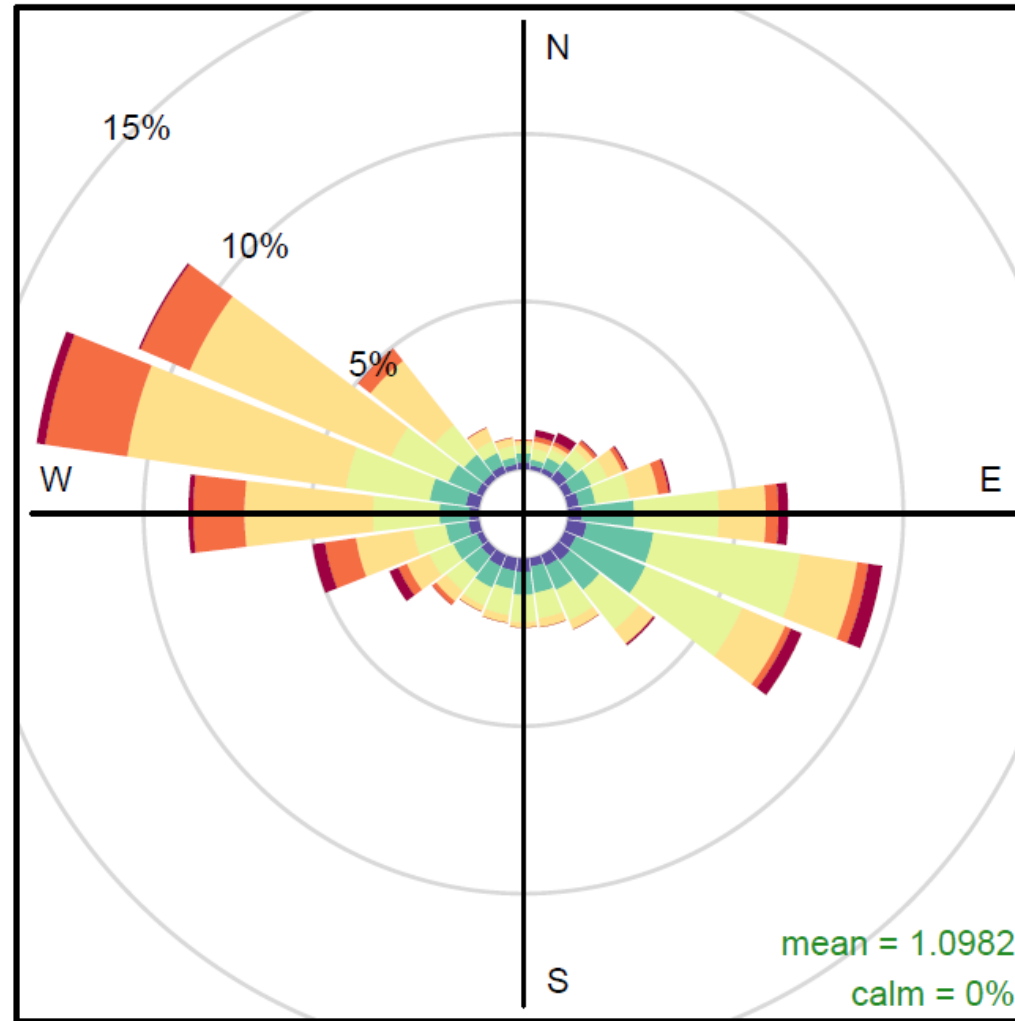
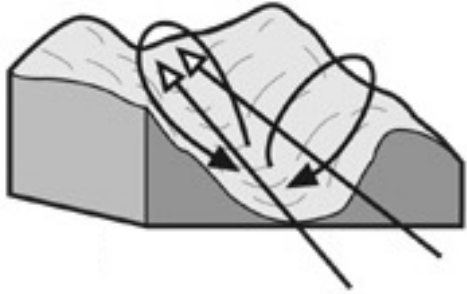
Frequency of counts by wind direction (%)

Wind Pfywald 19h Jun–Sep above canopy



Frequency of counts by wind direction (%)

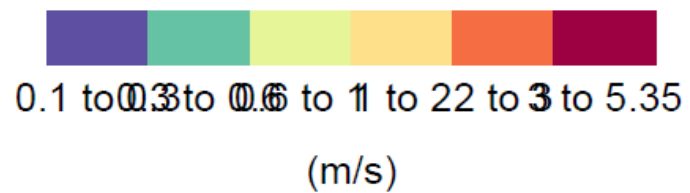
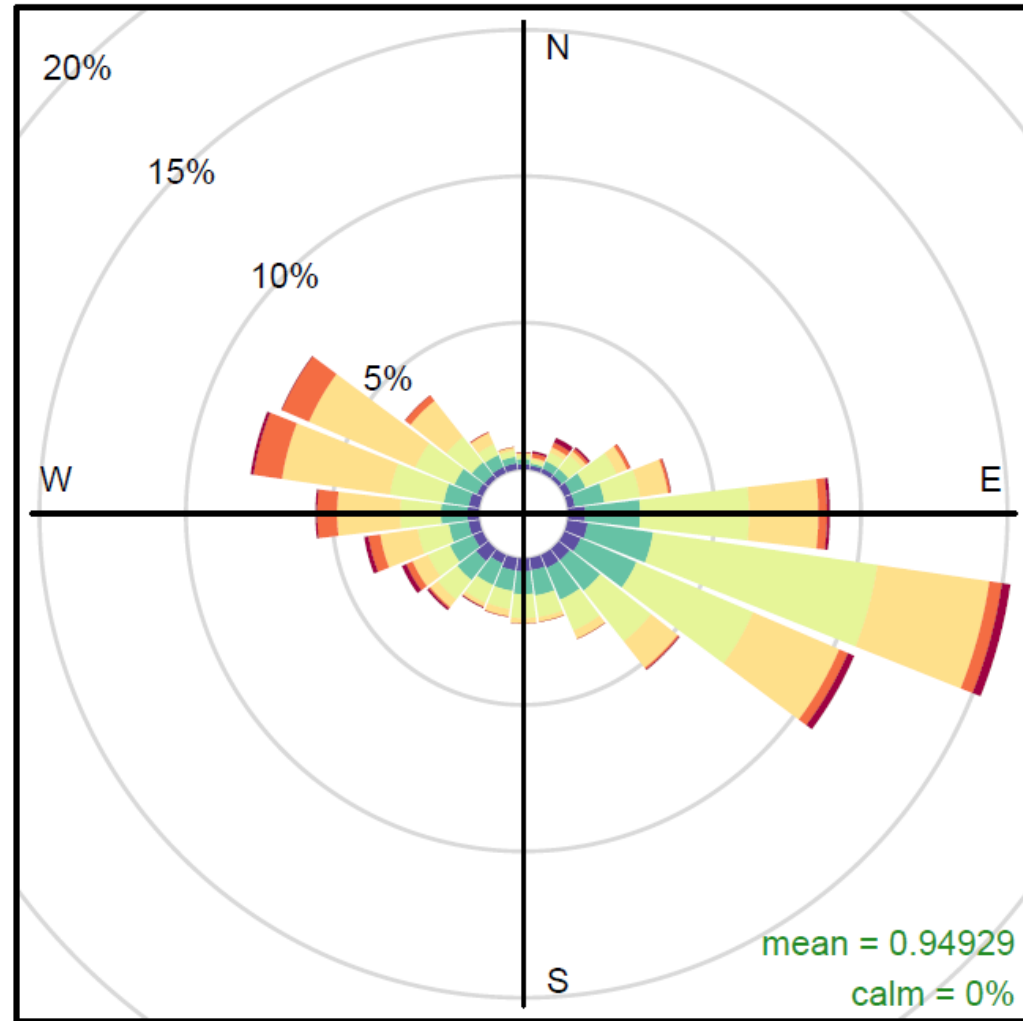
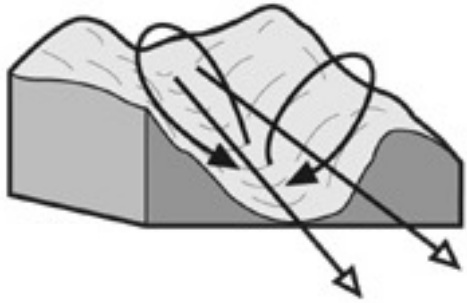
Wind Pfywald 20h Jun–Sep above canopy



(m/s)

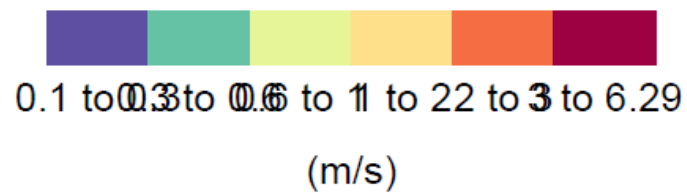
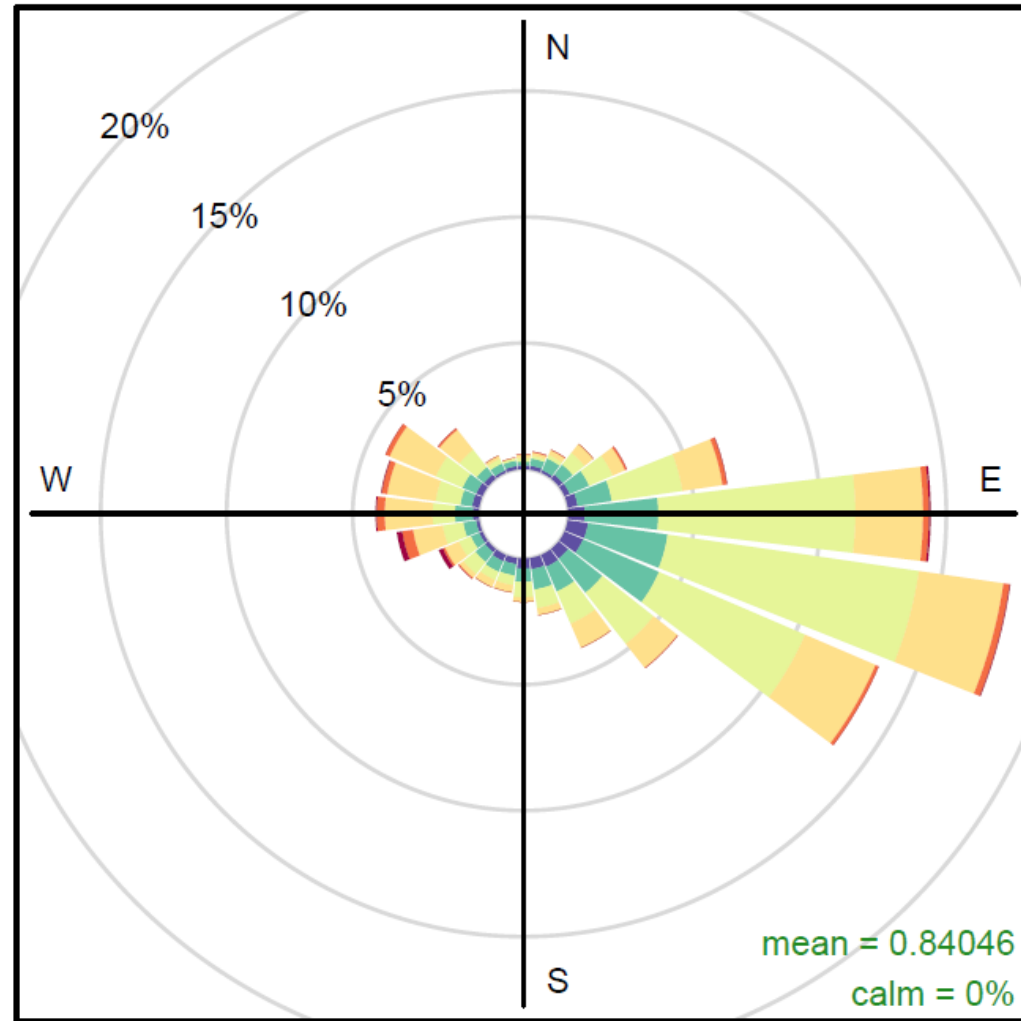
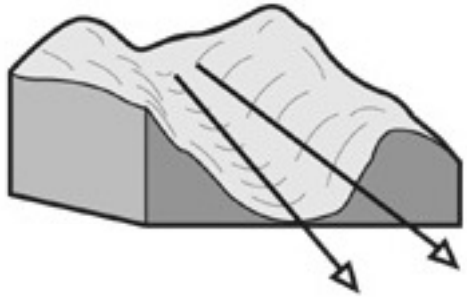
Frequency of counts by wind direction (%)

Wind Pfywald 21h Jun-Sep above canopy



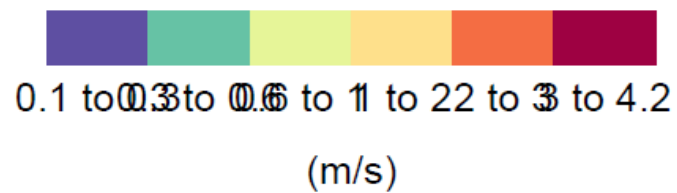
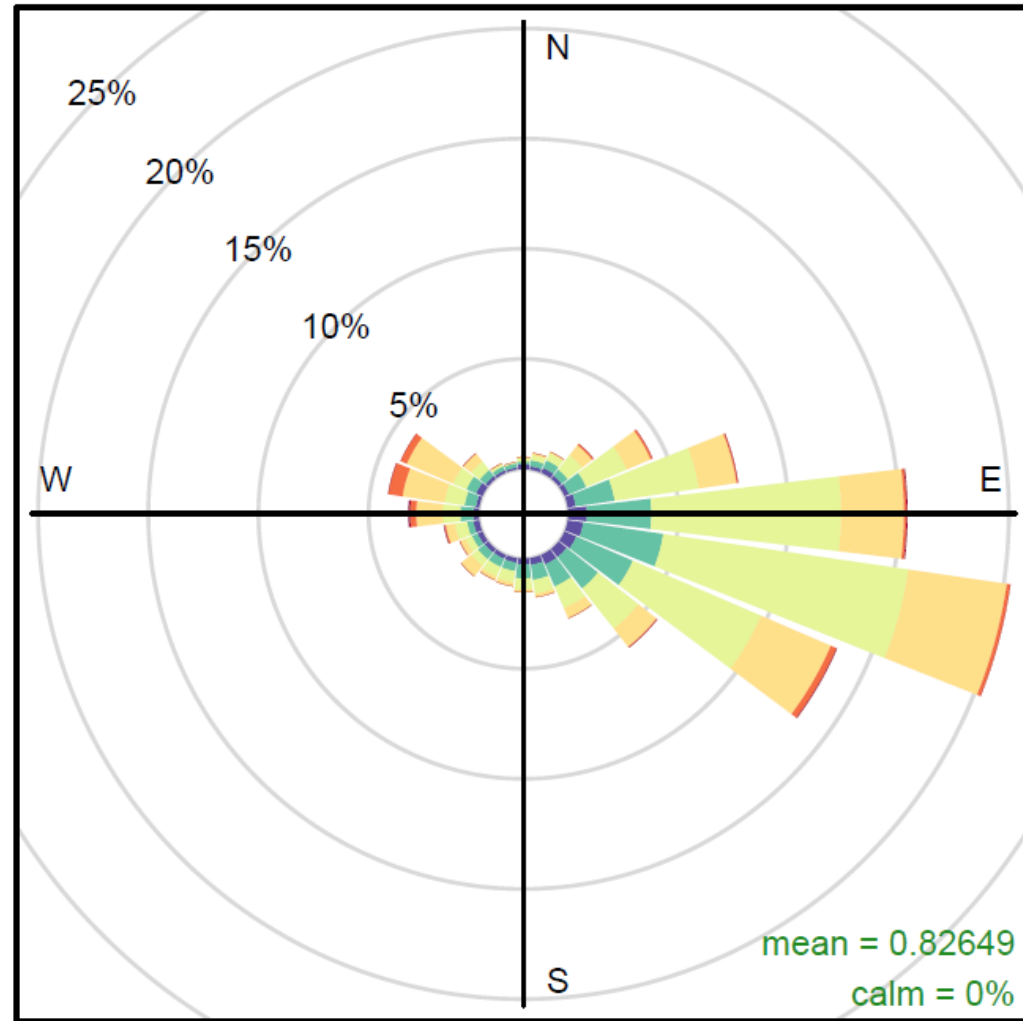
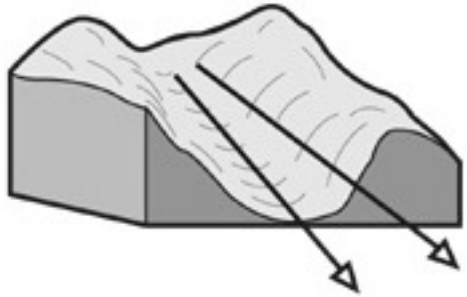
Frequency of counts by wind direction (%)

Wind Pfywald 22h Jun–Sep above canopy



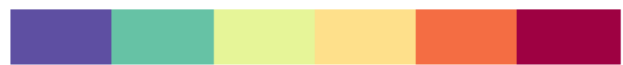
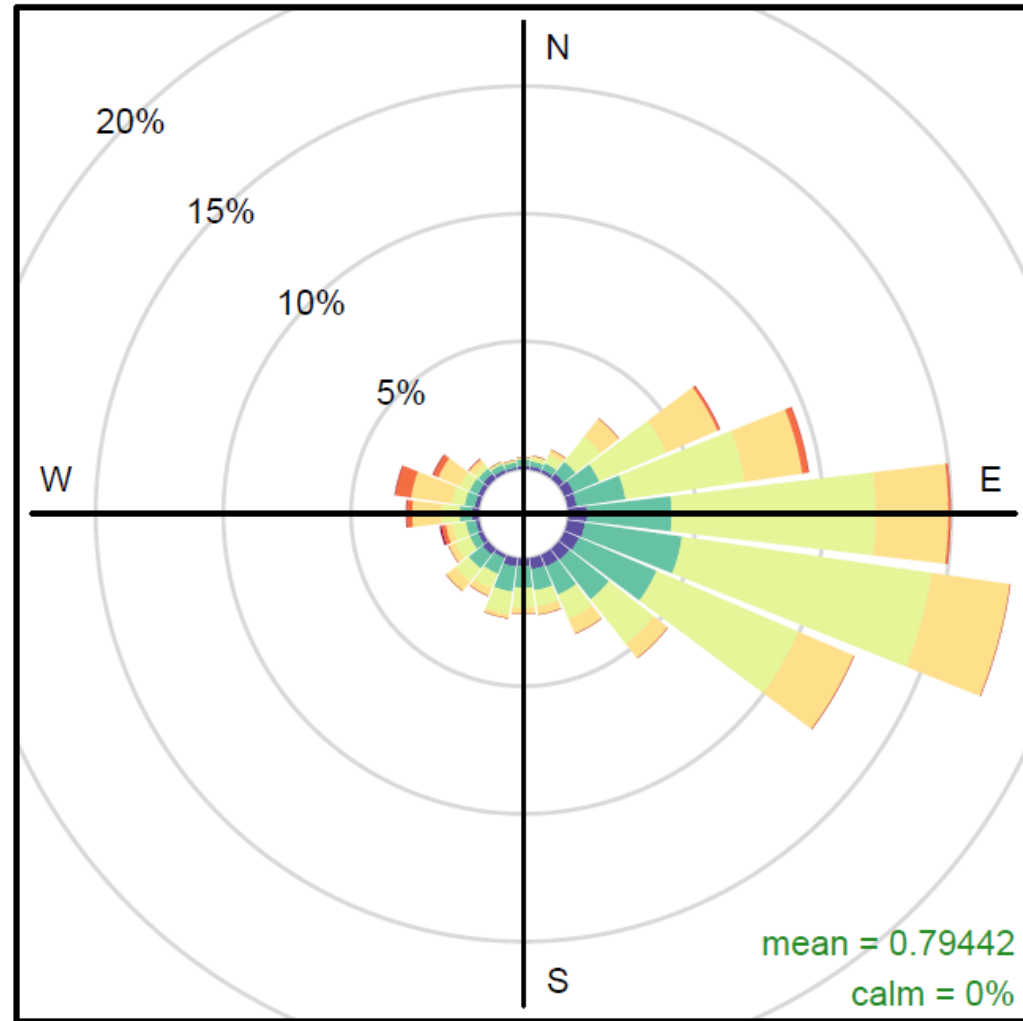
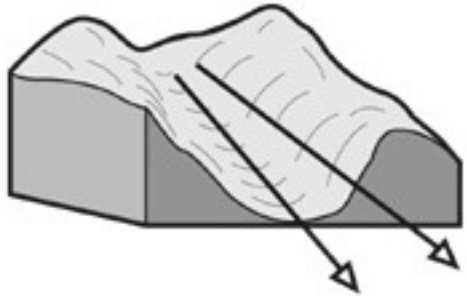
Frequency of counts by wind direction (%)

Wind Pfywald 23h Jun–Sep above canopy



Frequency of counts by wind direction (%)

Wind Pfywald 24h Jun–Sep above canopy



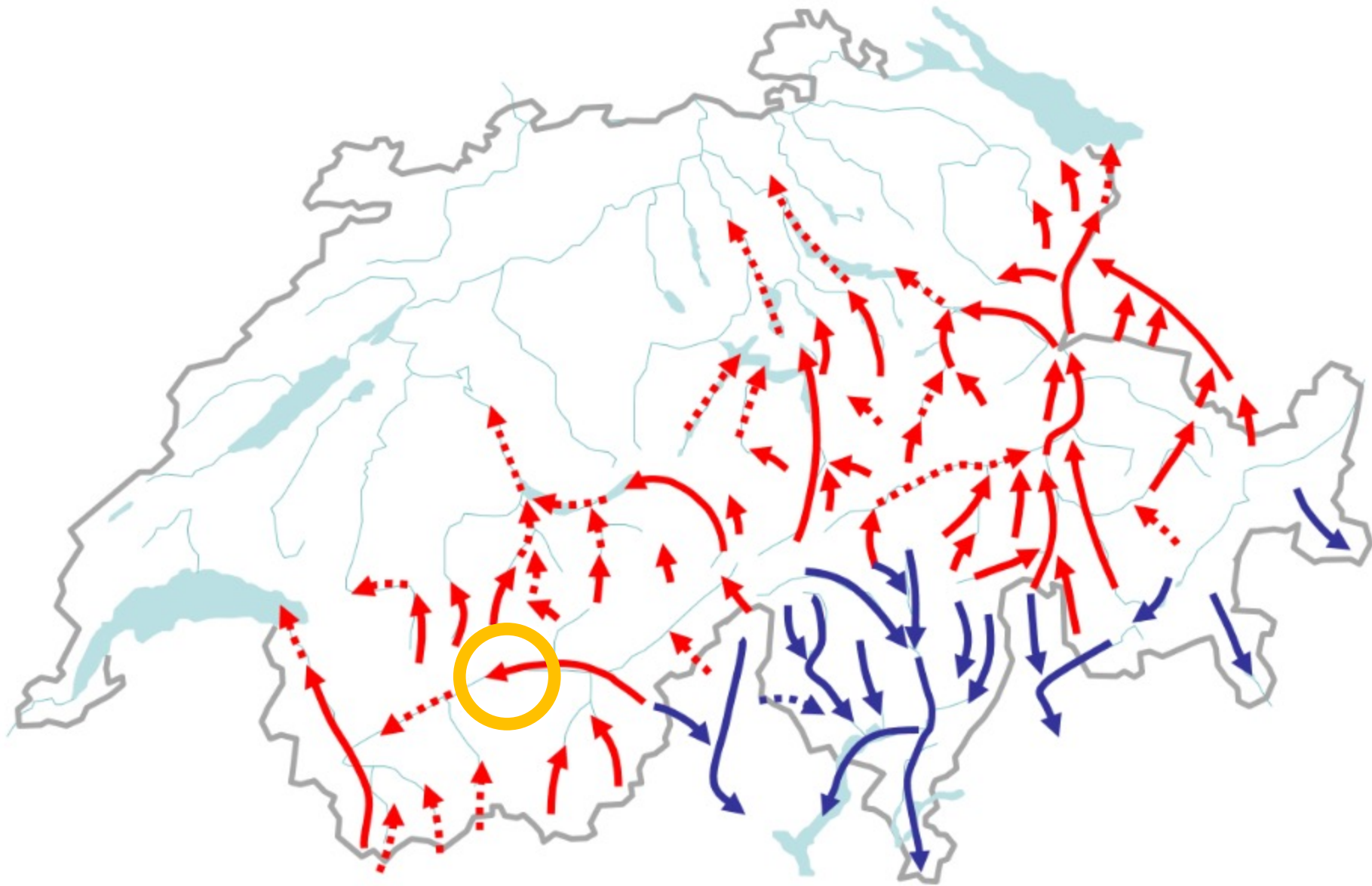
0.1 to 0.3 to 0.6 to 1 to 2 to 3 to 4.05

(m/s)

Frequency of counts by wind direction (%)

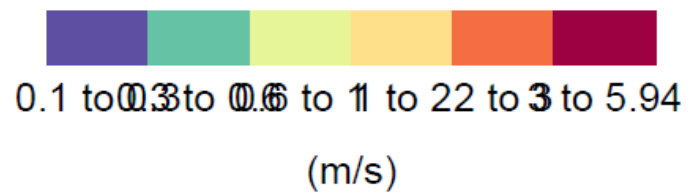
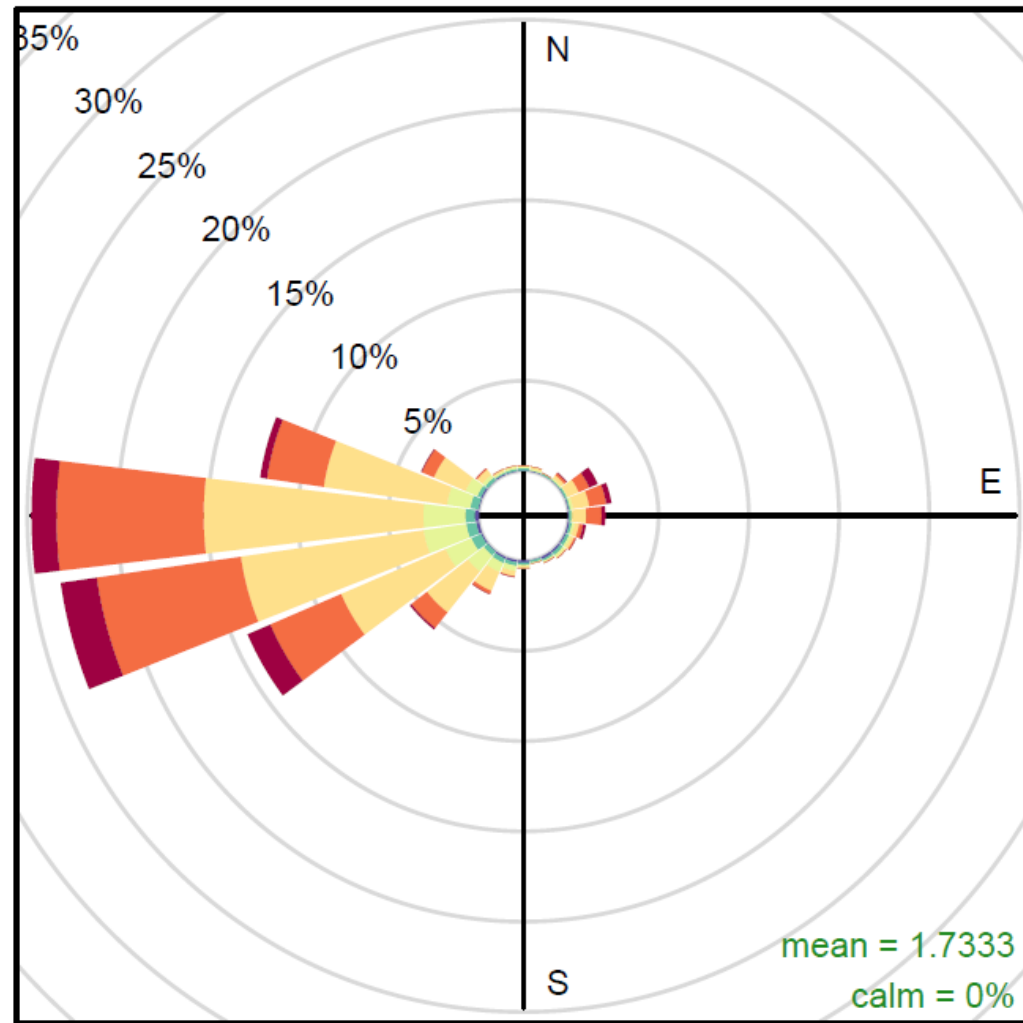
No rule without exception...

Watch out for «Südföhn»!



Vertical wind direction gradient

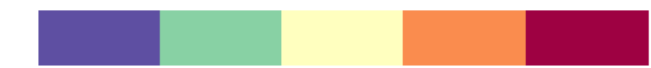
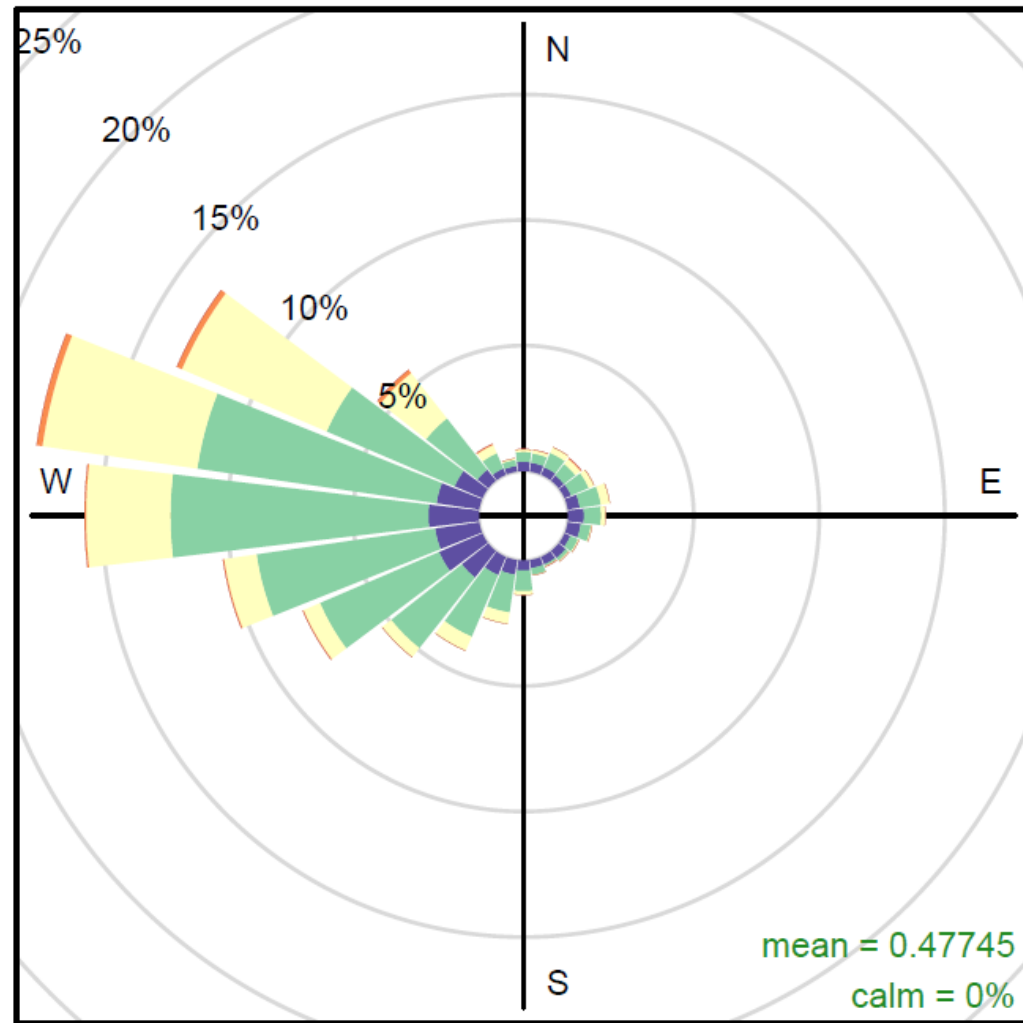
Wind Pfywald 15h Jun–Sep above canopy



Frequency of counts by wind direction (%)



Wind Pfywald 15h Jun–Sep in canopy



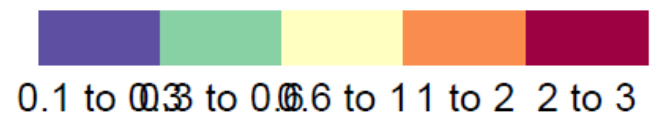
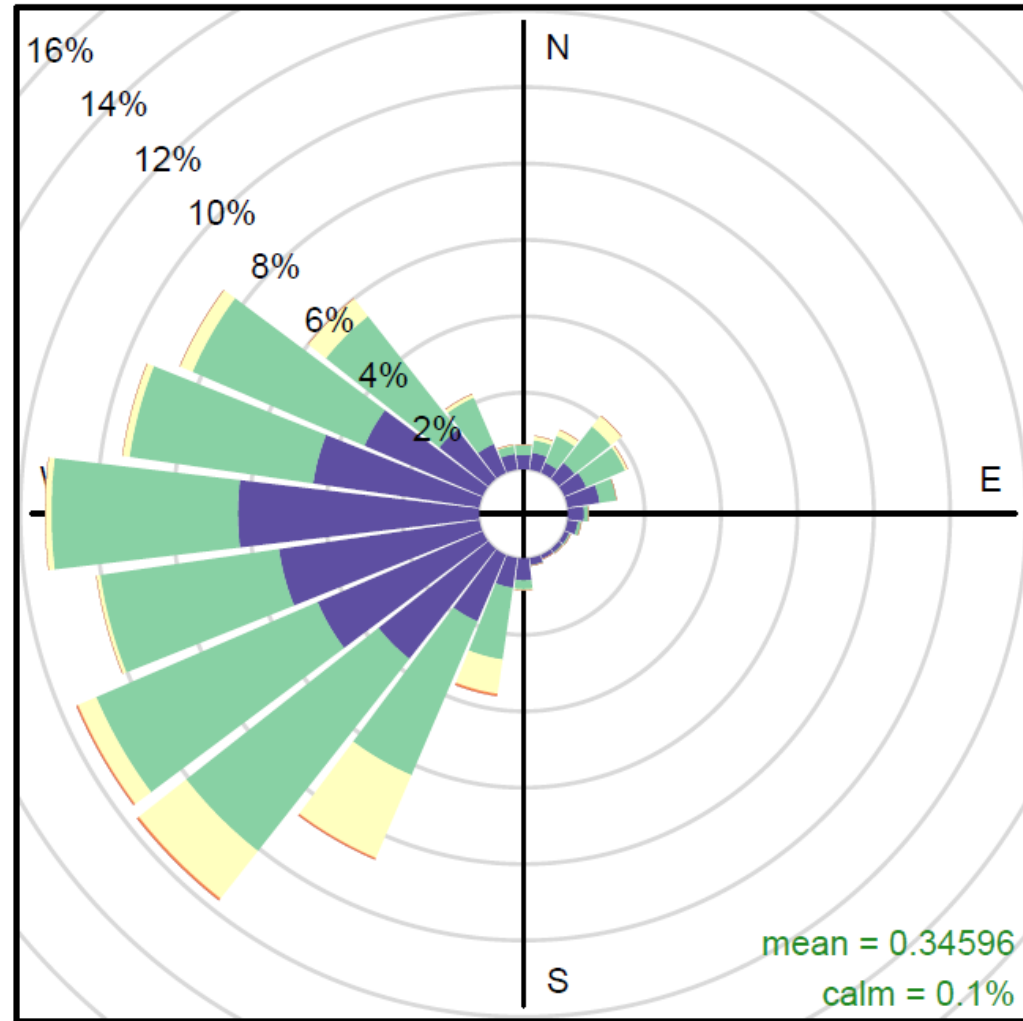
0.1 to 0.3 0.3 to 0.6 0.6 to 1 1 to 2 2 to 3

(m/s)

Frequency of counts by wind direction (%)



Wind Pfywald 15h Jun–Sep below canopy

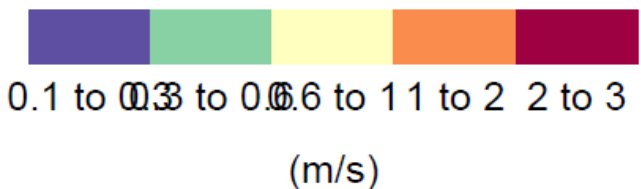
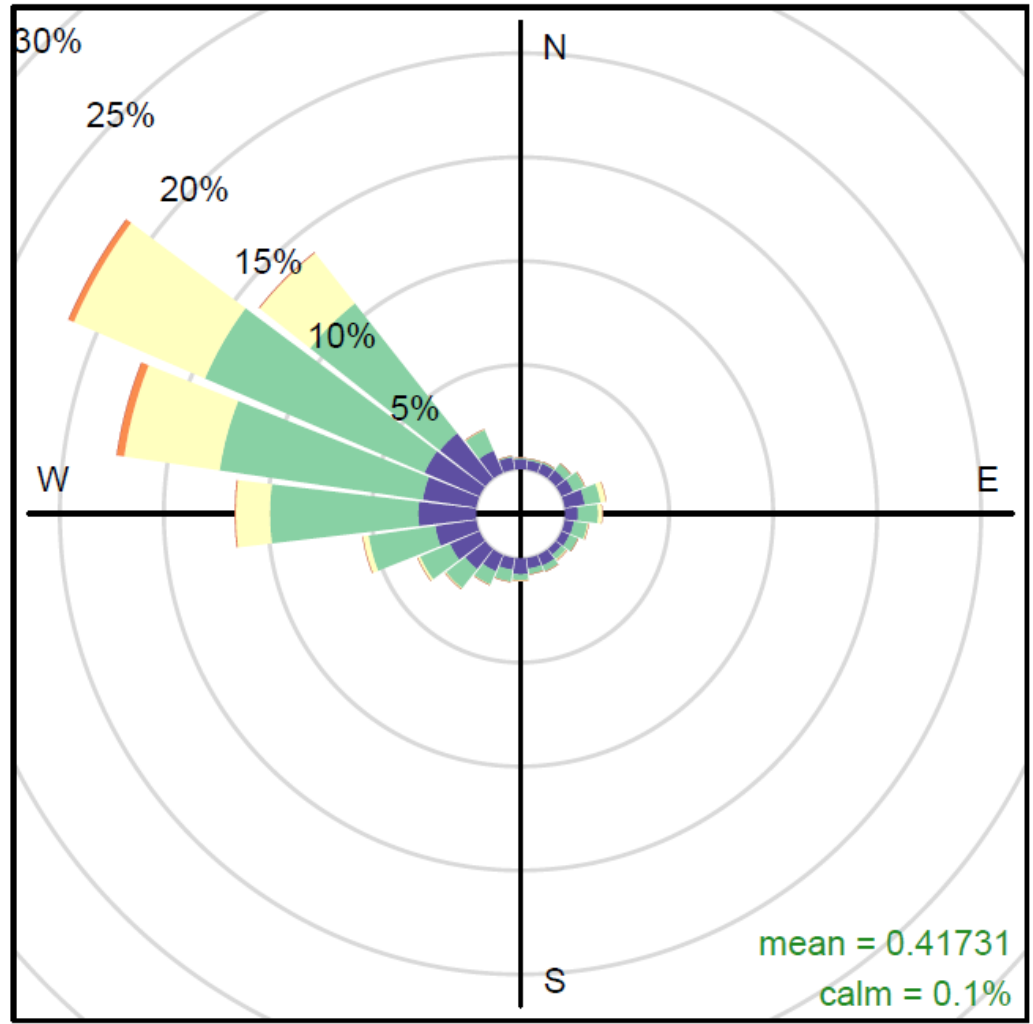


(m/s)

Frequency of counts by wind direction (%)



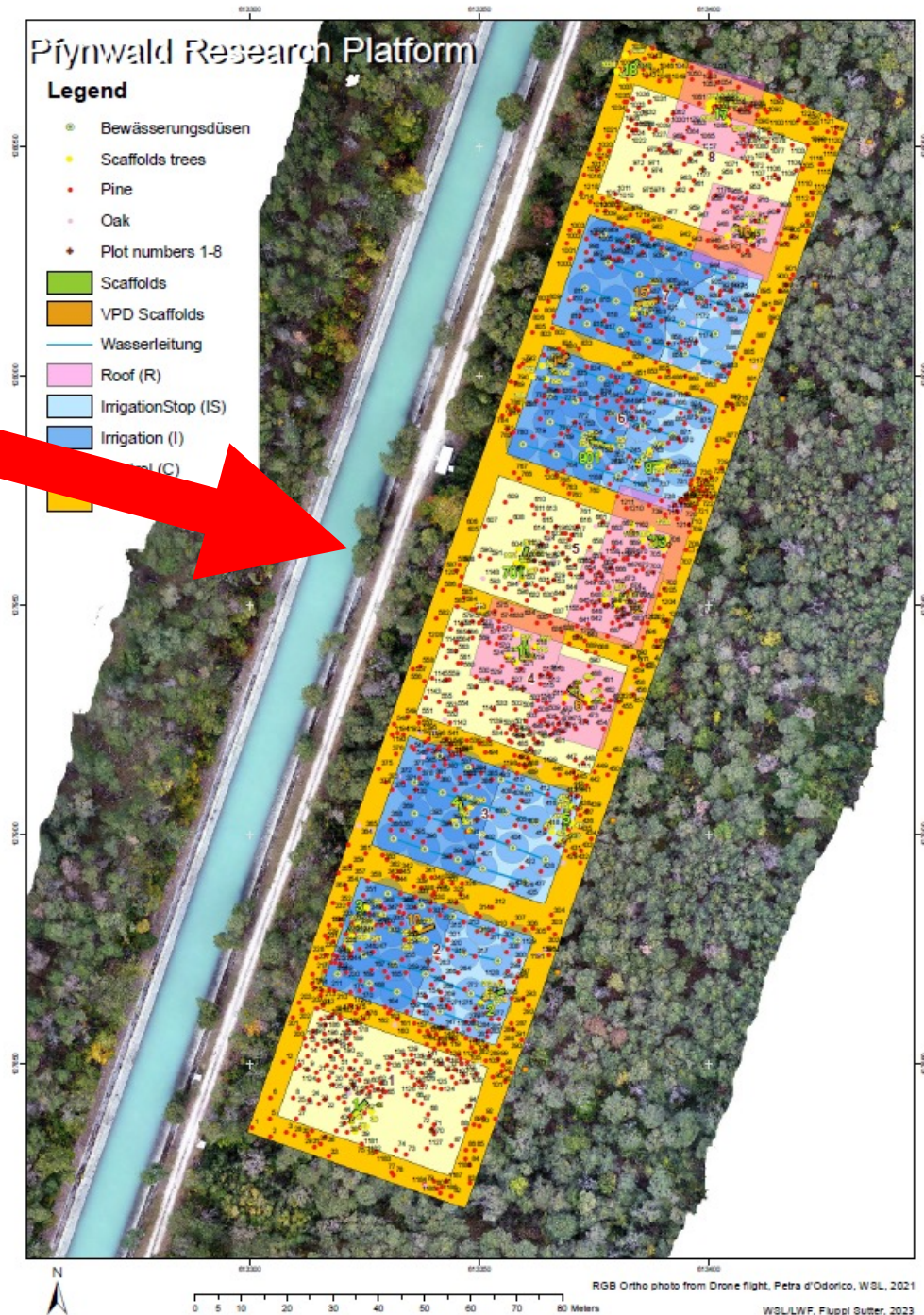
Wind Pfywald 15h Jun–Sep at 2 m

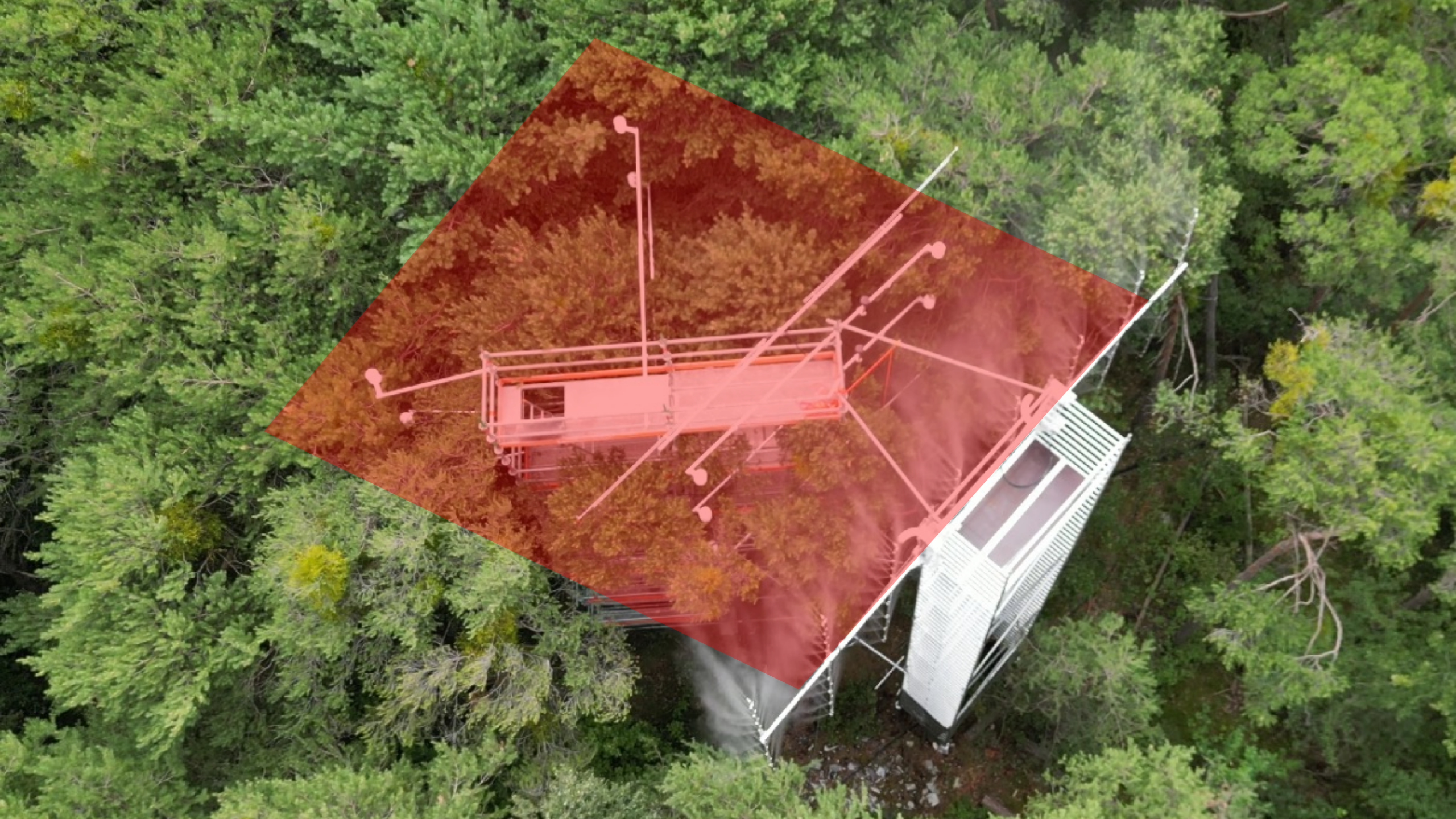


Frequency of counts by wind direction (%)



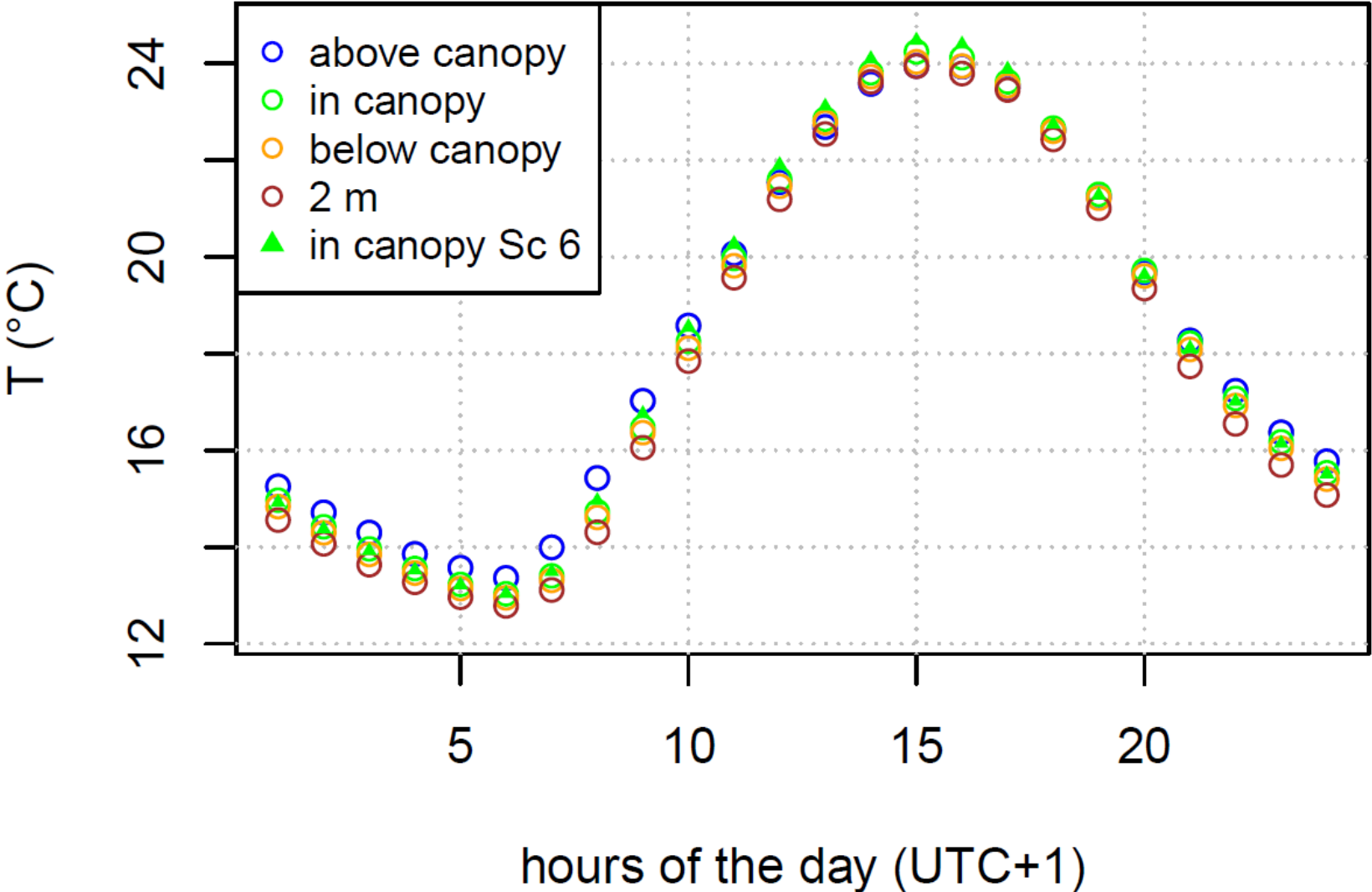
**Main relevant
wind direction:
285°**



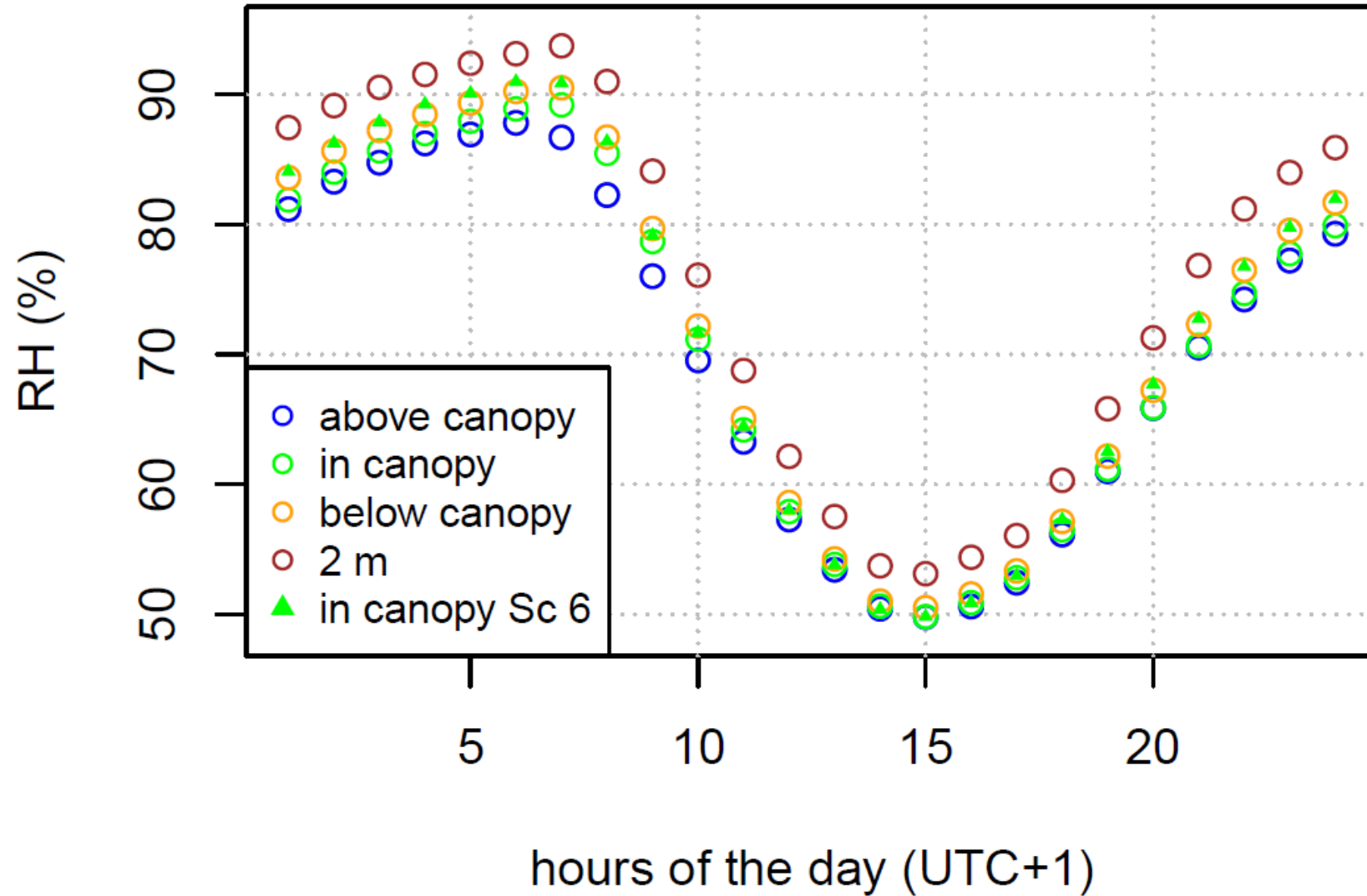


Vertical temperature, relative humidity, and VPD gradients

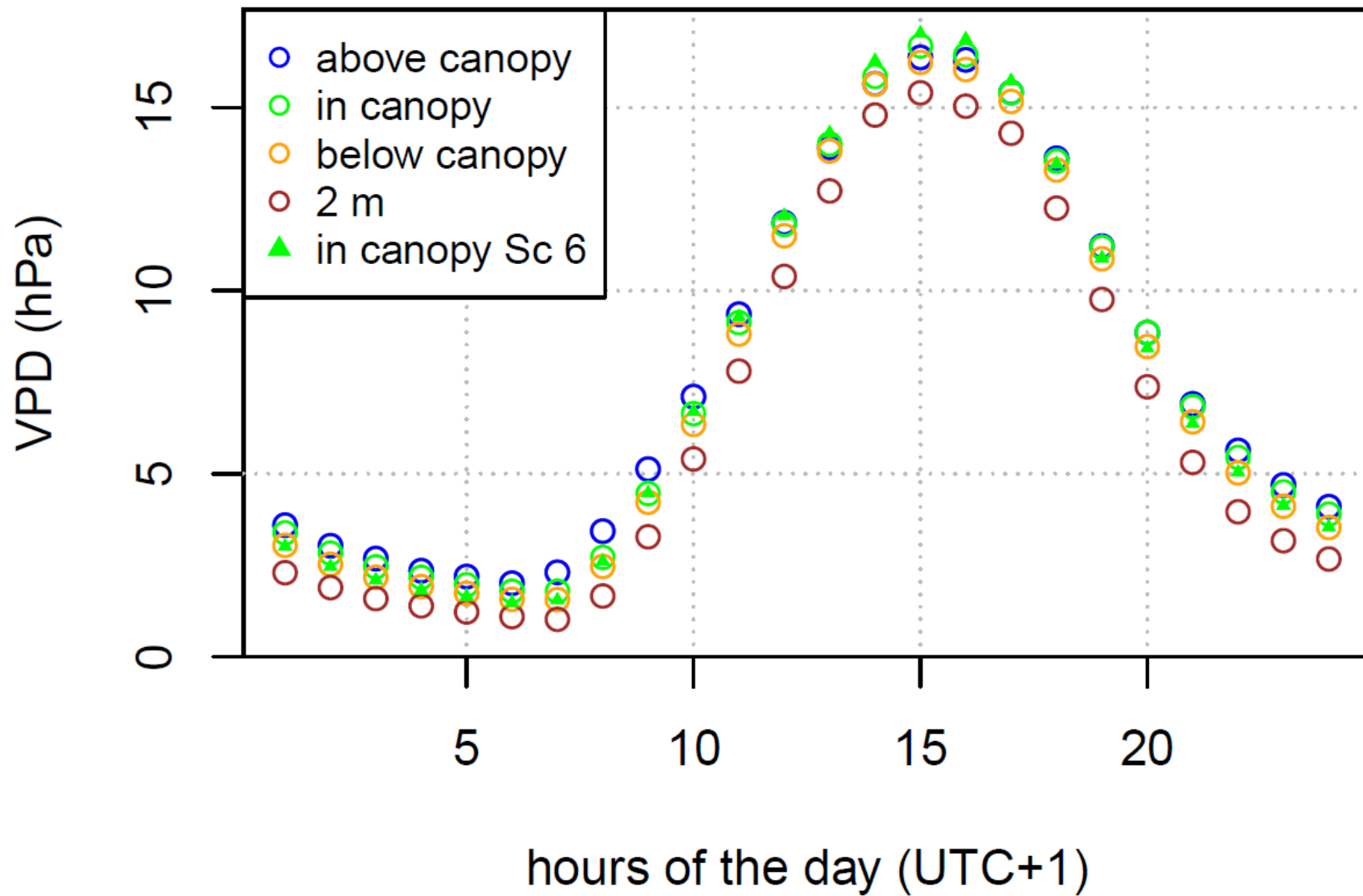
diurnal T cycle June–September 2021



diurnal RH cycle June–September 2021

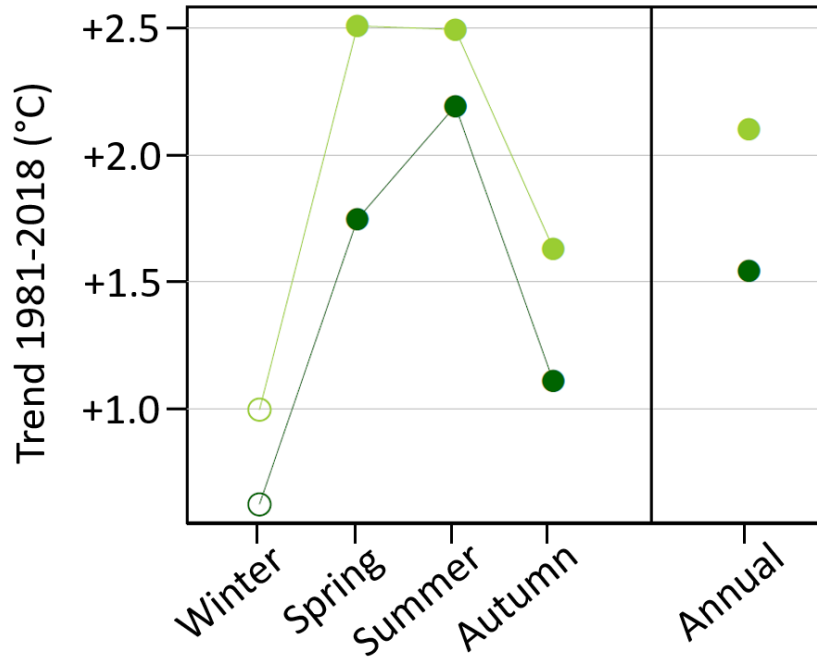


diurnal VPD cycle June–September 2021

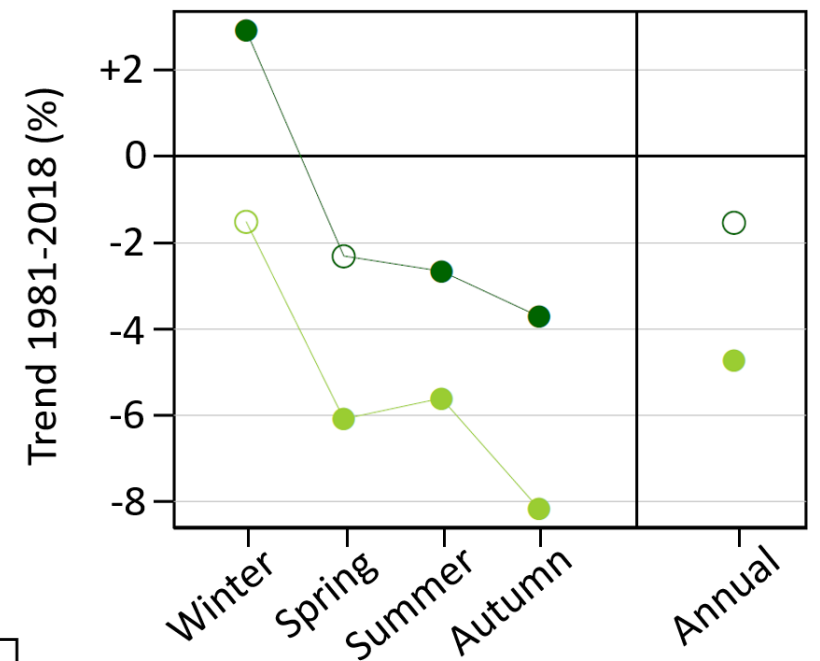


Climatic changes in the past decades

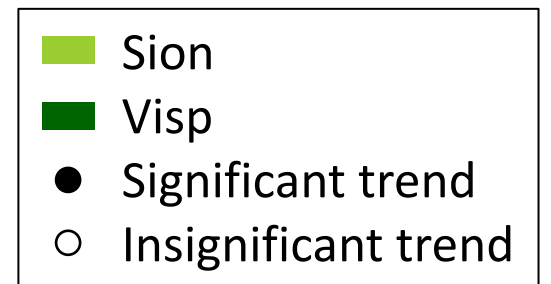
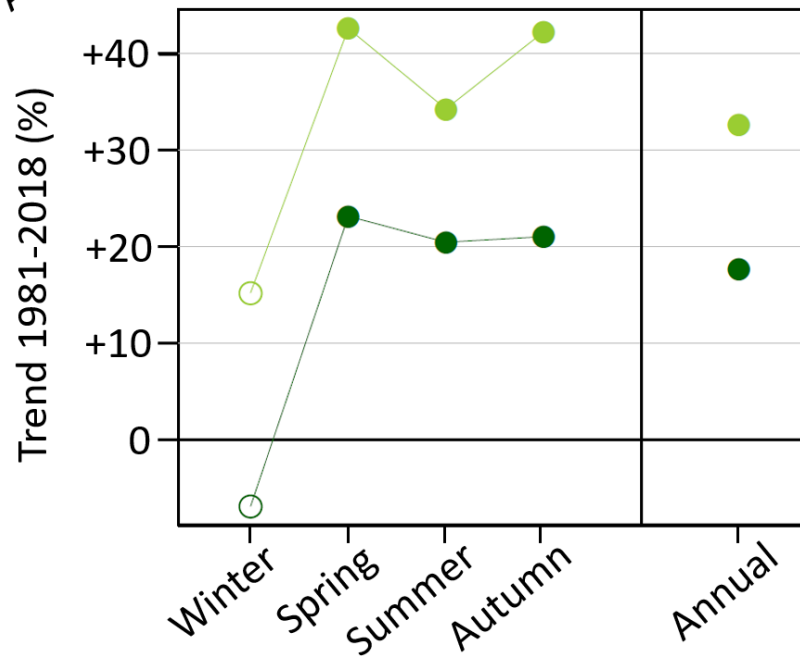
Mean air temperature



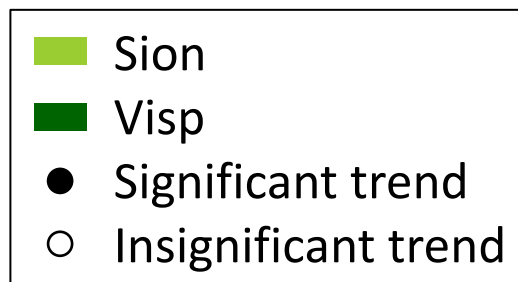
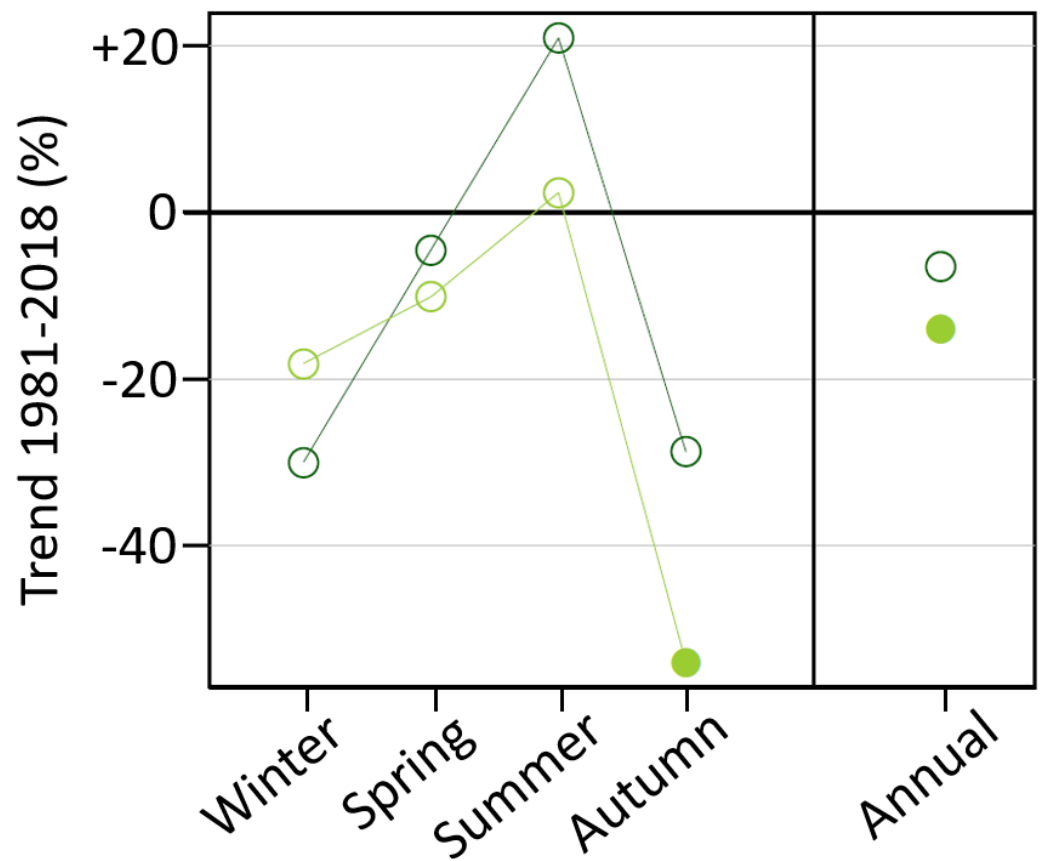
Relative humidity



VPD

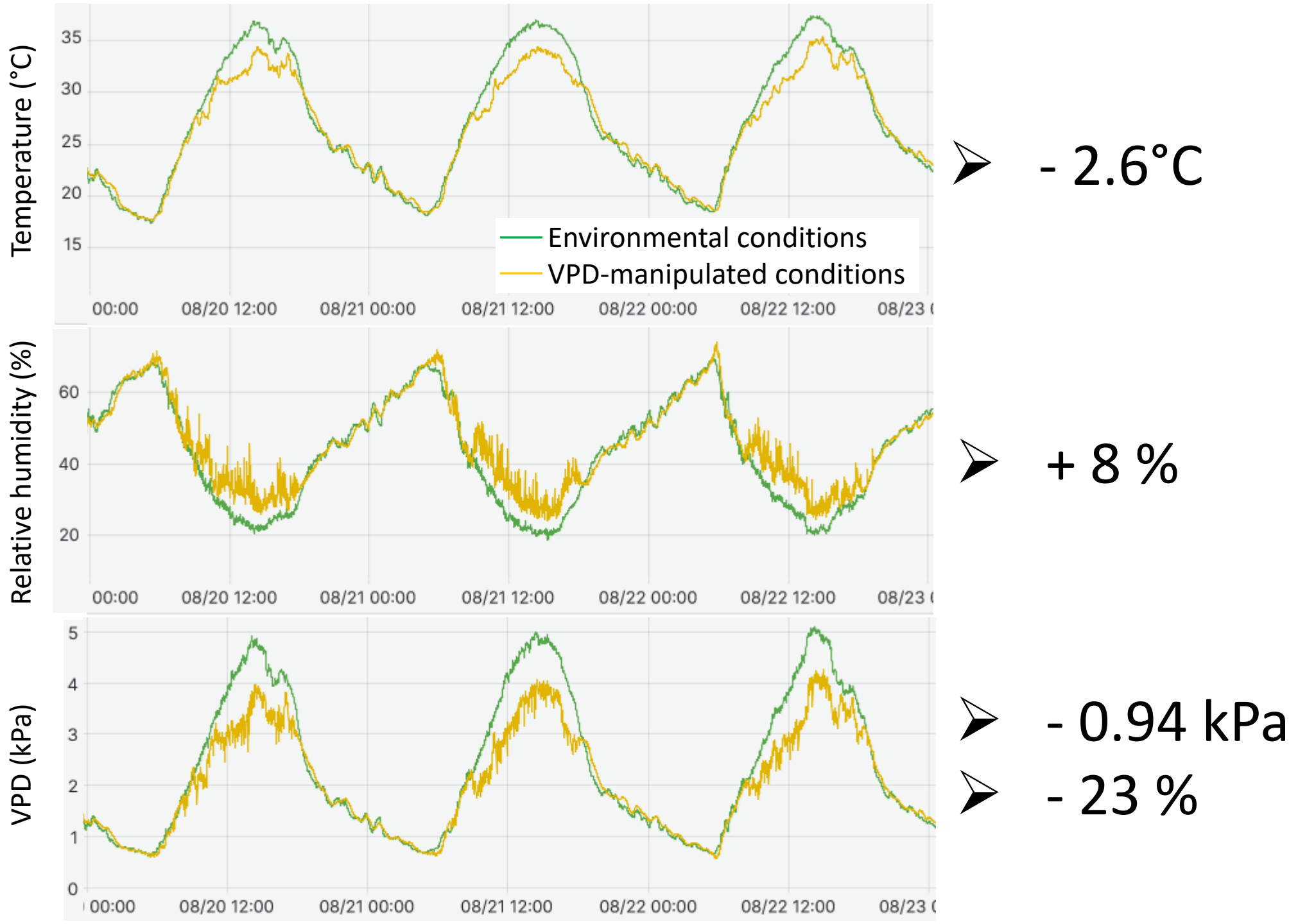


Precipitation



Test VPD manipulation in Pfynewald





Conclusions

- **Very suitable meteorological conditions (constant wind patterns)**
- **VPD manipulation works**
- **Manipulations well related to climatic changes**
 - **Turn back the clock (VPD)**
 - **Look into the future (precipitation)**

