

# *Meteorological measurements in Reyðarfjörður 1998-2000*

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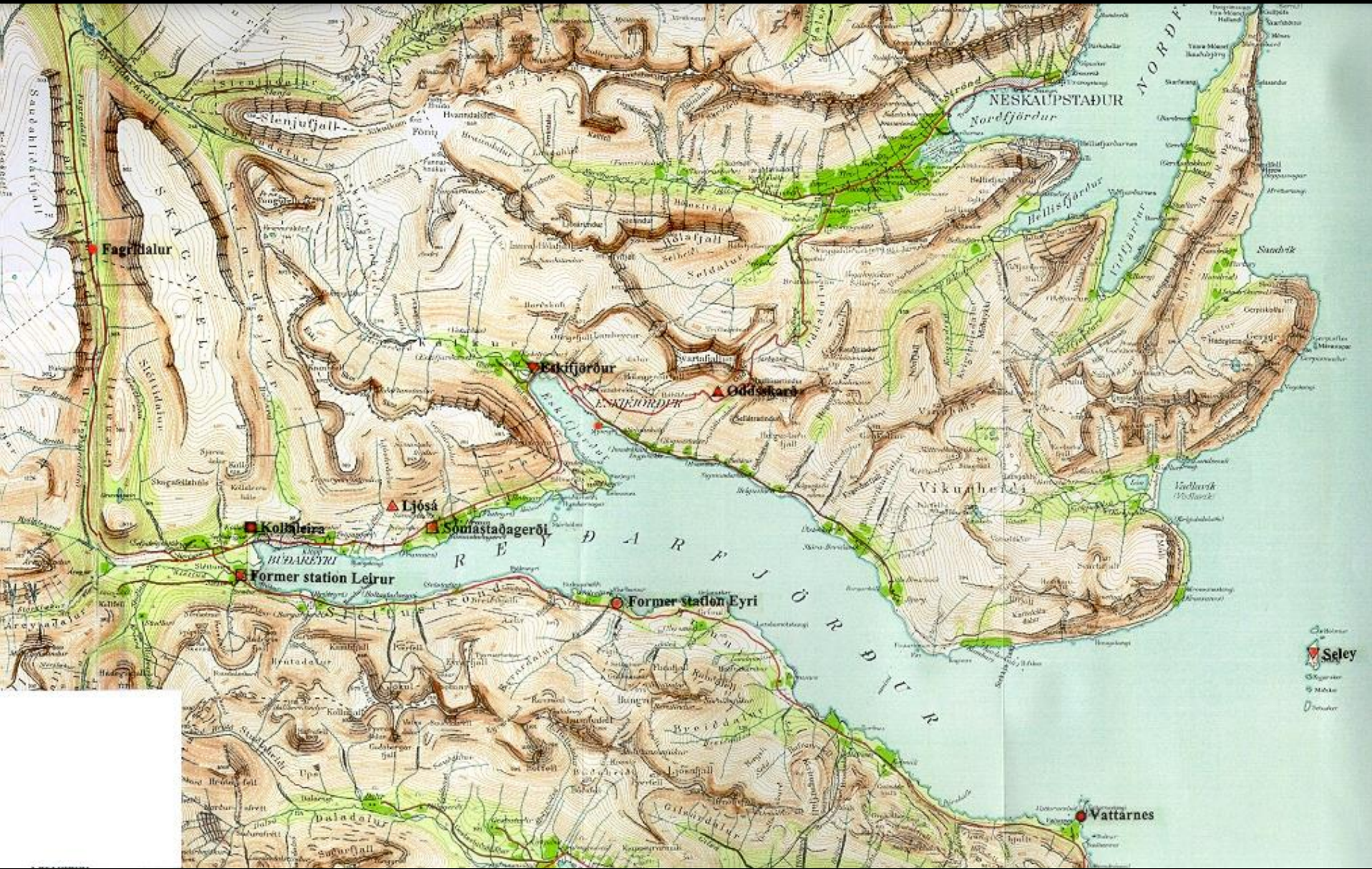
# Objectives

*Comprehensive meteorological measurements have been carried out in Reyðarfjörður to assess the danger of:*

- *Prolonged periods of calm or light winds.*
- *Multiple recirculation of polluted air in the fjord.*
- *Temperature inversions that act as a lid for dispersion of polluted air at some height in the fjord.*







# *Stations in Reyðarfjörður*

- *Kollaleira - manned station (1976- )*
- *Sómastaðagerði - Mjóeyri (1981-1985)*
- *Eyri - Leirur (1993-1995)*
- *Eskifjörður (1998- ), Gagnheiði (1993- )*
- *Oddskað (1995- ), Fagridalur (1996- ) (Vg, PRA)*
- *Seley (1996- ) (Siglingast, IMA)*
- *Sómastaðagerði (1998-04- )*
- *Vattarnes - Ljósá - Kollaleira (2000-06- )*

# *Kollaleira*

- *Manned climatic station (1976-1984)*
- *Manned synoptic station (old farm) (1984-1990)*
- *Manned synoptic station (new farm) (1990- )*
- *W-L Wind-recorder, 2m (1982- )*
- *Windspeed recorder, 10m (1998-10- )*
- *Automatic weather station (2000-06- )*







Kollaleira

4 6'00

Kollaleira

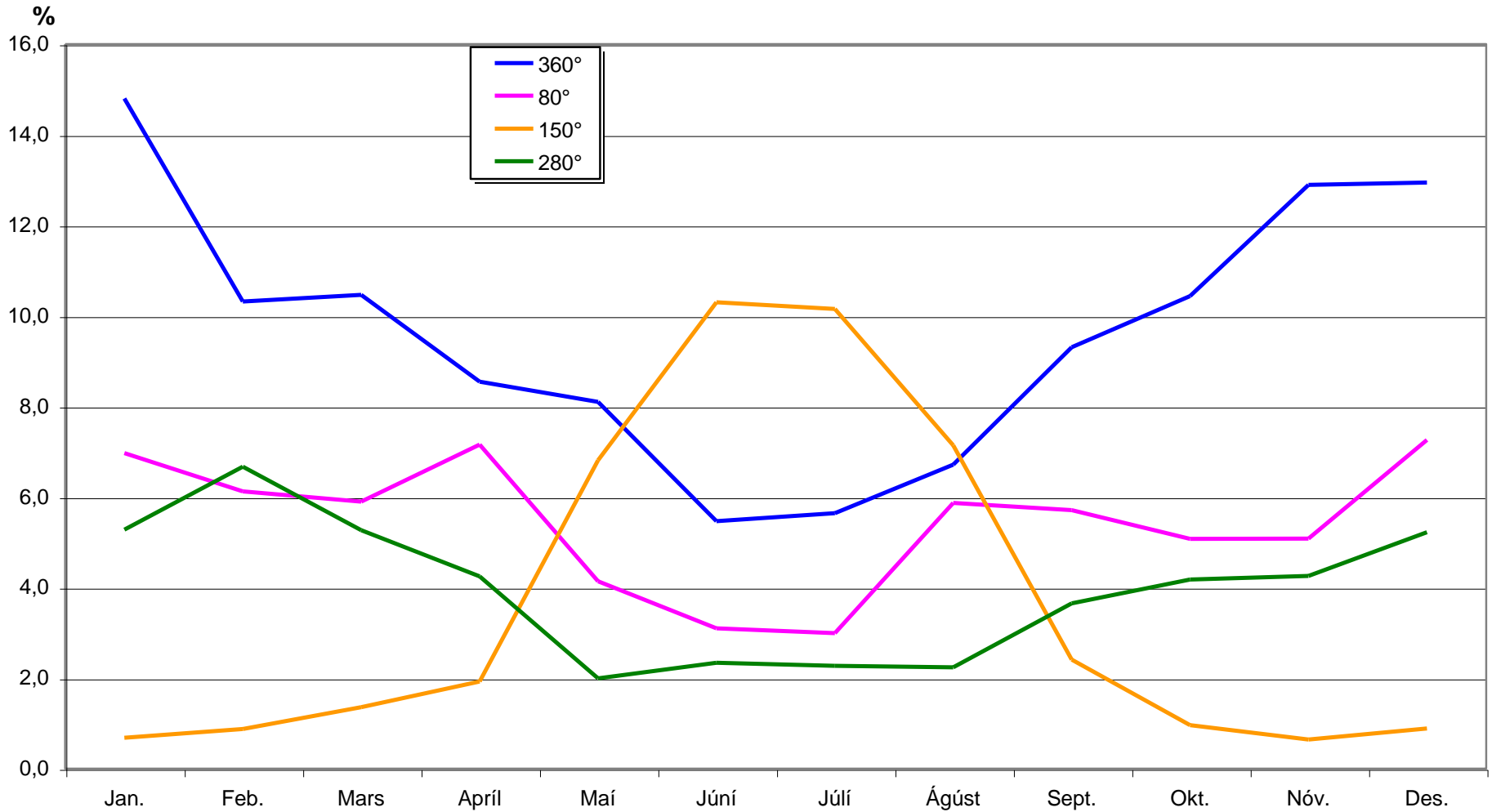




**Kollaleira - Woelfle Lambrecht wind-recorder**

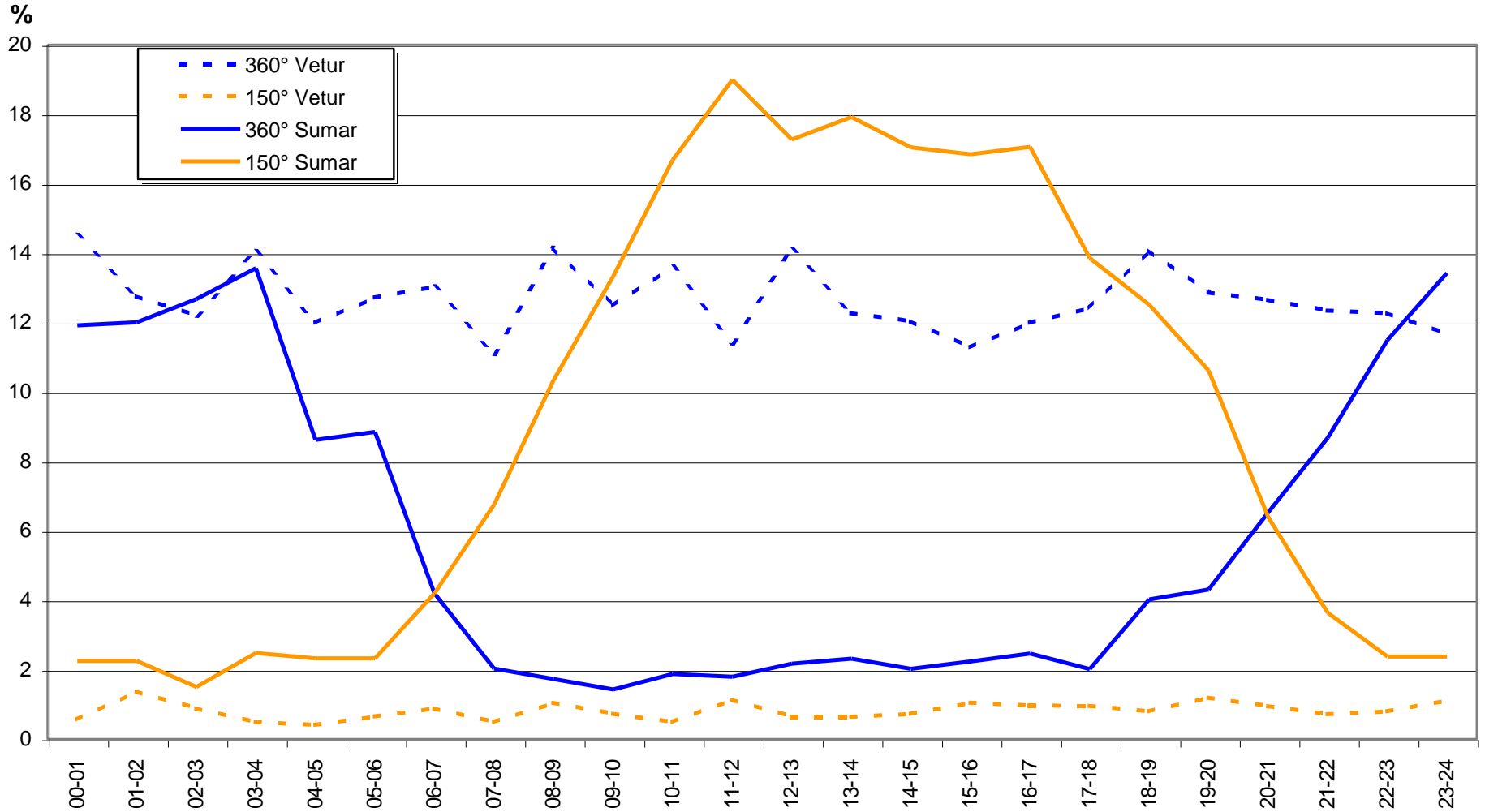
# *Kollaleira 1983-1998*

*Annual variation in frequency of wind directions*



# Kollaleira 1983-1998

## Diurnal variation in frequency of wind directions



Eyri

1993-06 to 1994-09



Leirur (Sléttunes)  
1993-06 to 1995-10







# *Sómastaðagerði*

*Since 1998-04*

*Measurements in a 38 m mast recorded every 10 min*

- Air temperature at 3, 10, and 37m*
- Relative humidity at 3 m*
- Young windspeed, gust, direction and SD of direction at 10 m*
- 3D Gill windspeed and SD of windspeed at 10 and 37 m*

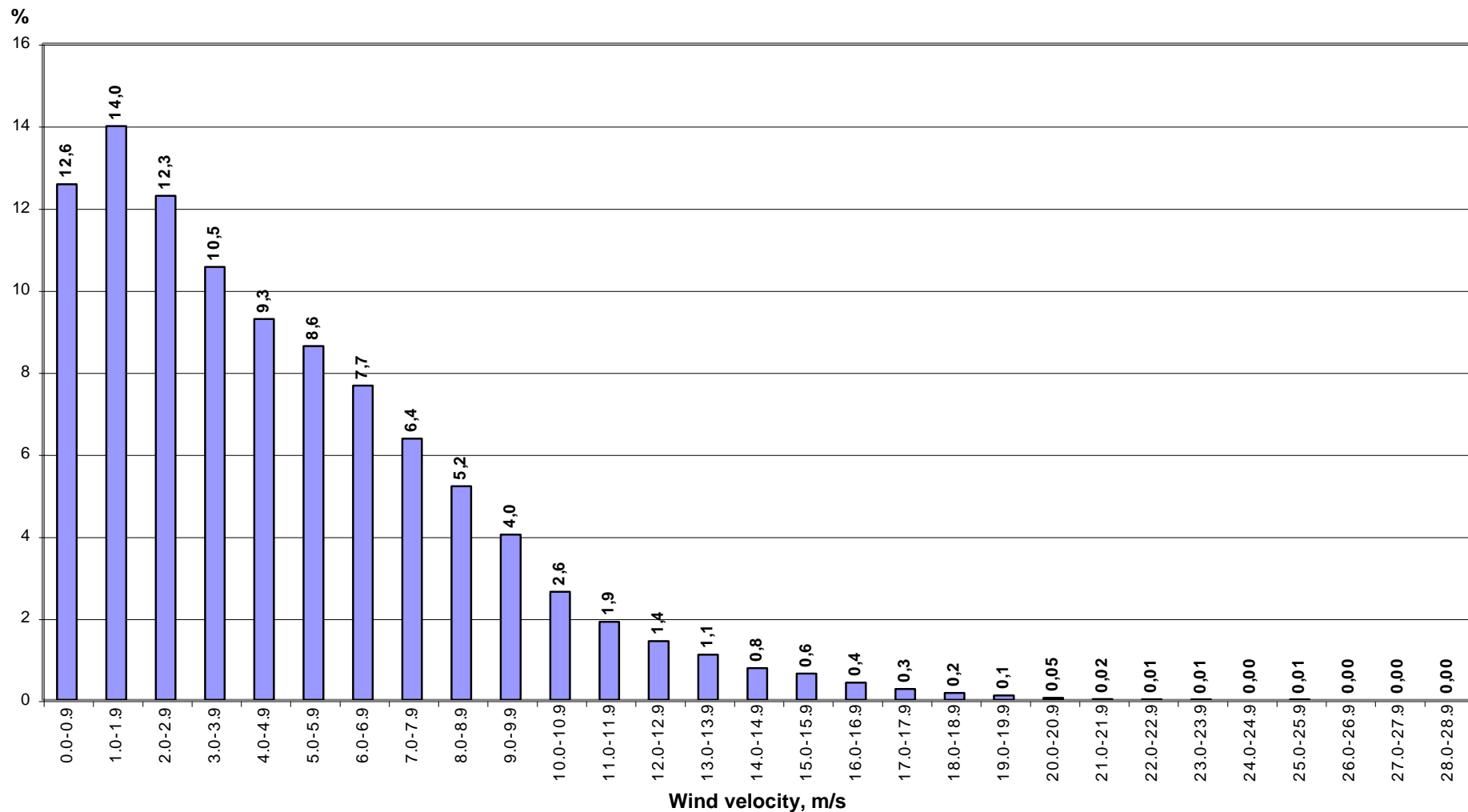


Sómastaðagerði 1998-04



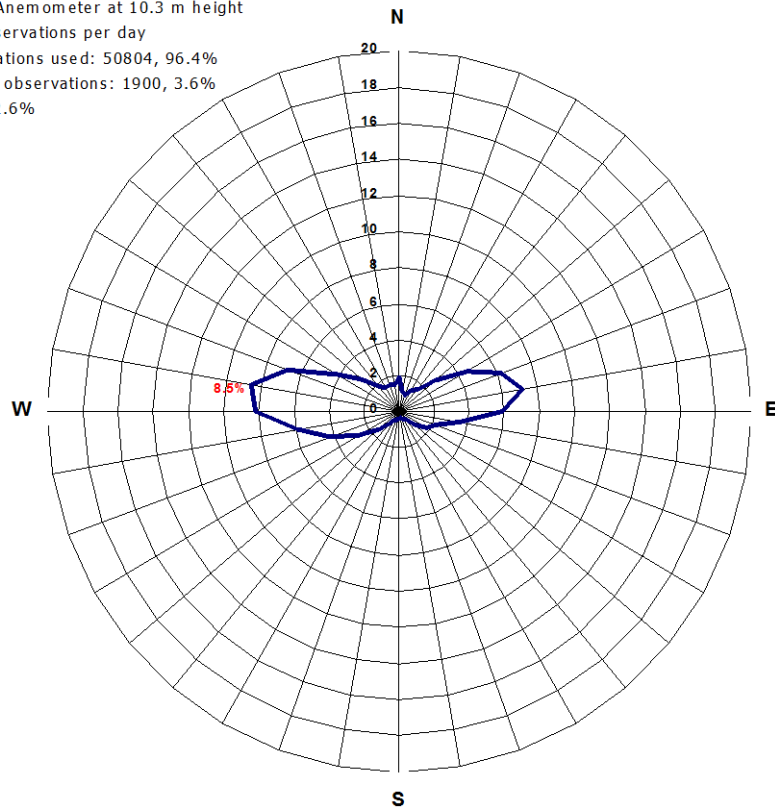
# Sómastaðagerði

Wind speed distribution, May 1998 - April 1999

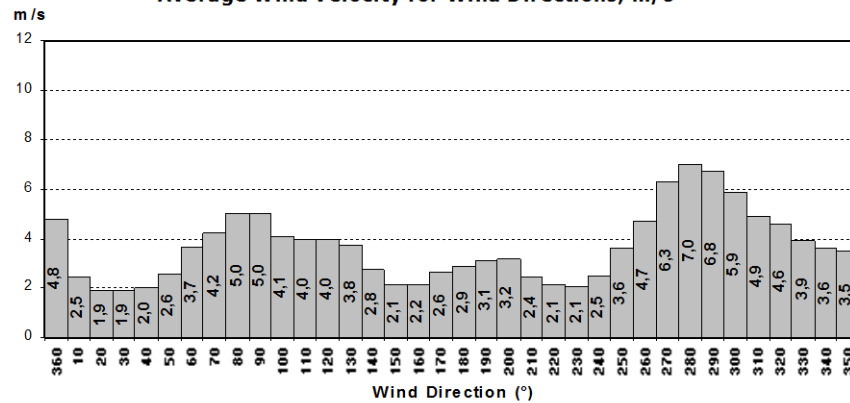


### Frequency of Wind Directions, % Year, May 1999 - April 2000

Young Anemometer at 10.3 m height  
 144 observations per day  
 Observations used: 50804, 96.4%  
 Missing observations: 1900, 3.6%  
 Calm: 2.6%

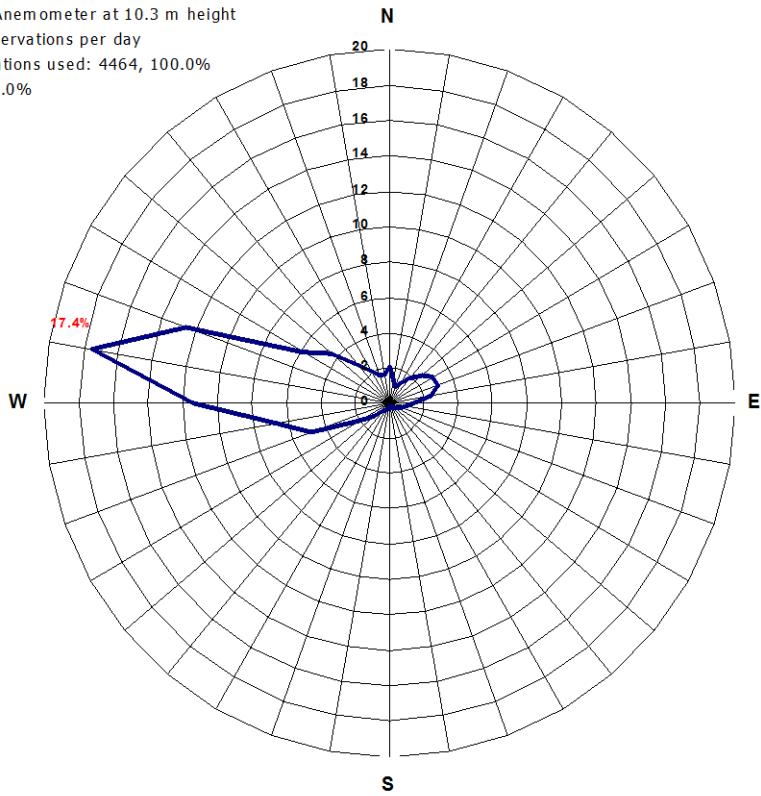


### Average Wind Velocity for Wind Directions, m/s



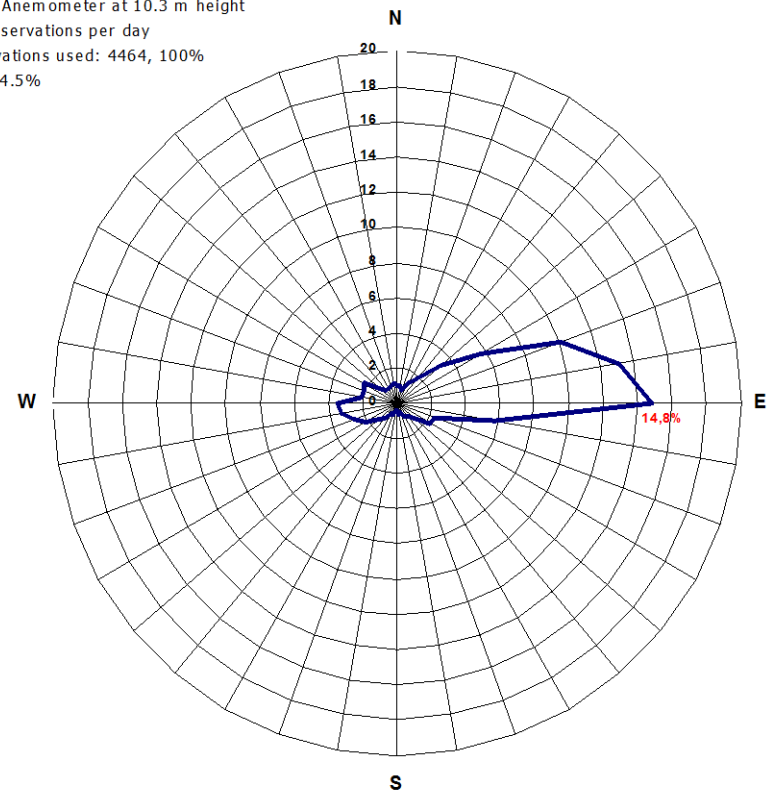
### Frequency of Wind Directions, % January 2000

Young Anemometer at 10.3 m height  
144 observations per day  
Observations used: 4464, 100.0%  
Calm: 1.0%

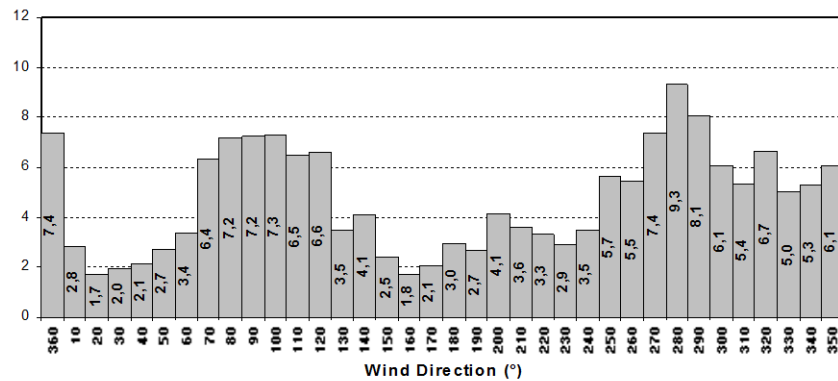


### Frequency of Wind Directions, % July 2000

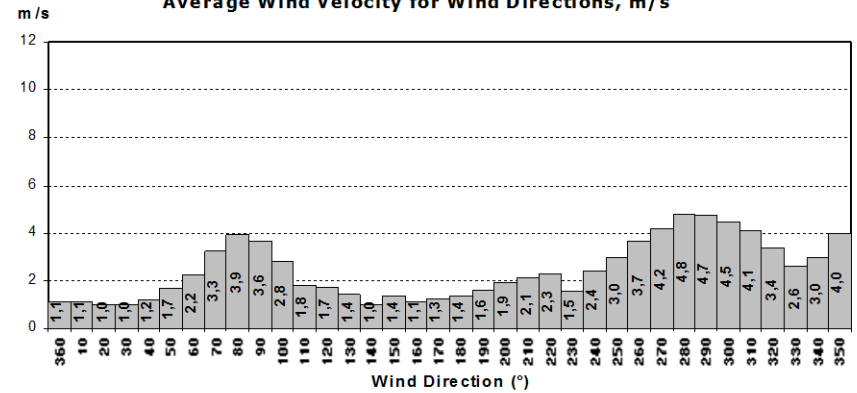
Young Anemometer at 10.3 m height  
144 observations per day  
Observations used: 4464, 100%  
Calm: 4.5%



### Average Wind Velocity for Wind Directions, m/s

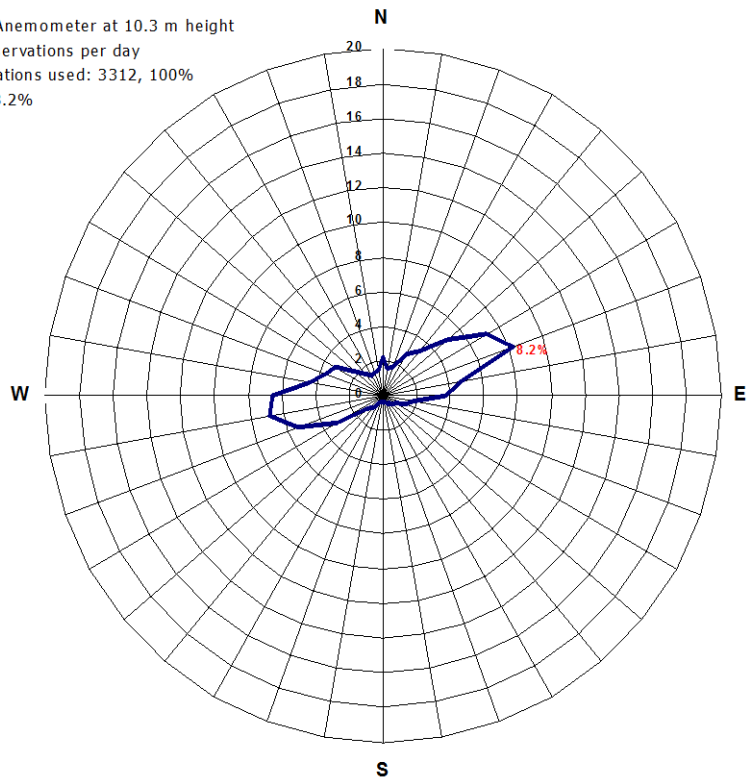


### Average Wind Velocity for Wind Directions, m/s



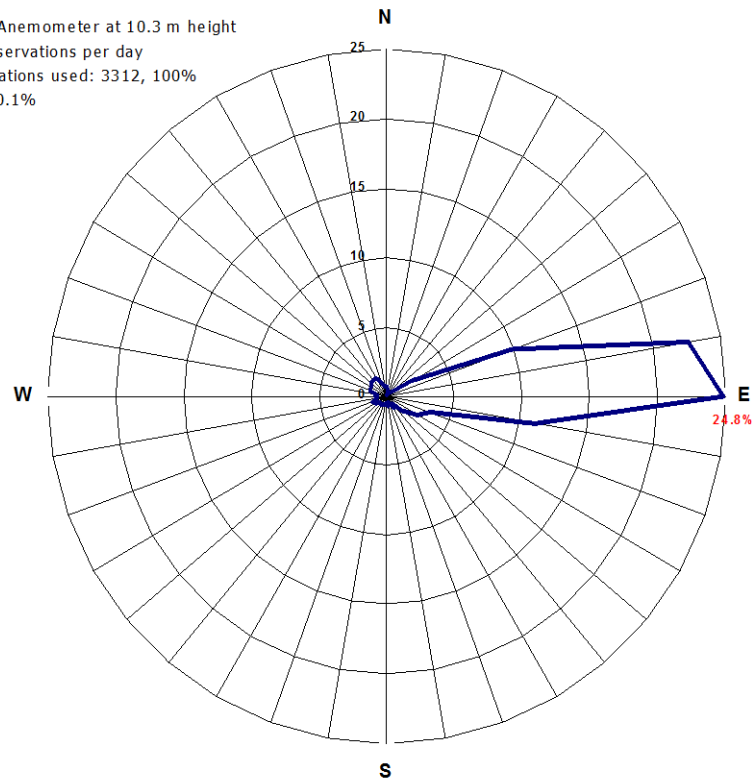
### Frequency of Wind Directions, % High Summer, June - August 2000, Night Hours 00 - 06 GMT

Young Anemometer at 10.3 m height  
144 observations per day  
Observations used: 3312, 100%  
Calm: 8.2%

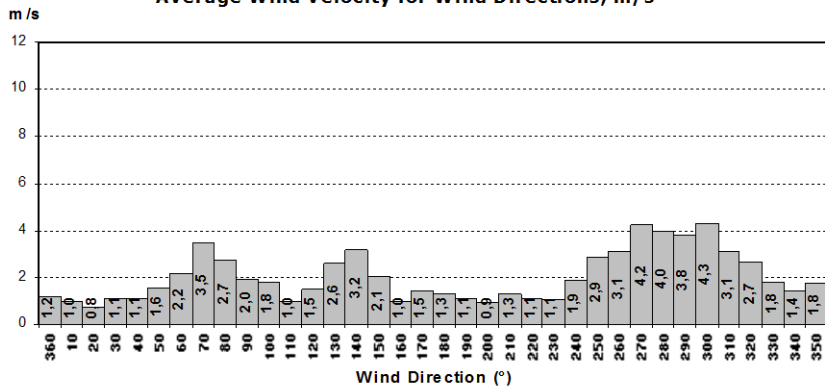


### Frequency of Wind Directions, % High Summer, June - August 2000, Day Hours 12 - 18 GMT

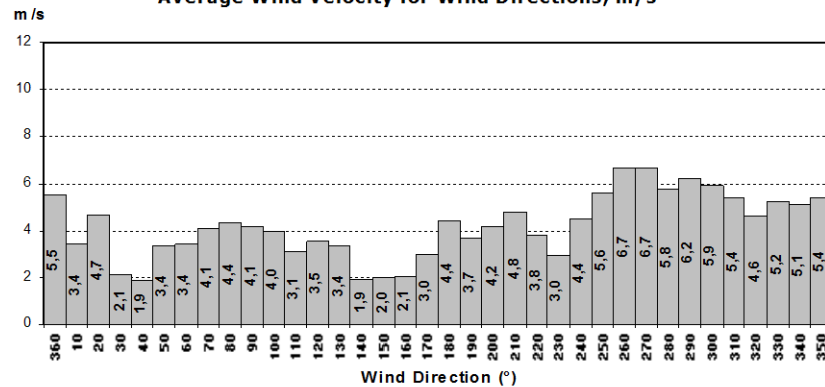
Young Anemometer at 10.3 m height  
144 observations per day  
Observations used: 3312, 100%  
Calm: 0.1%



#### Average Wind Velocity for Wind Directions, m/s



#### Average Wind Velocity for Wind Directions, m/s



# *Sea and land breeze*

- *Easterly winds during days*
  - *Westerly winds during nights*
  - *Reversed winds at a higher level*
  - *How high is this circulation cell?*
- 
- *Air rises at the end of the Reyðarfjörður valley*
  - *Air descends over the sea*
  - *Does the air descend inside the fjord?*

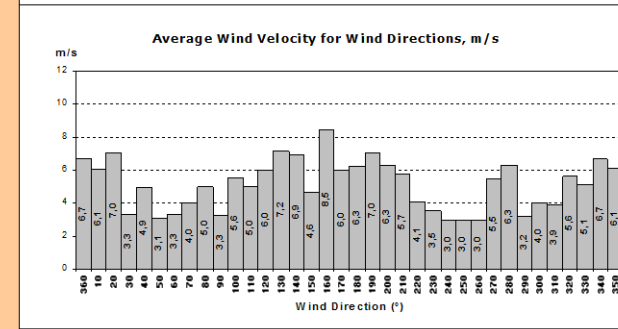
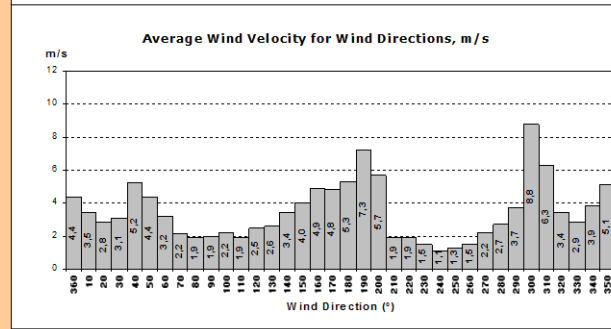
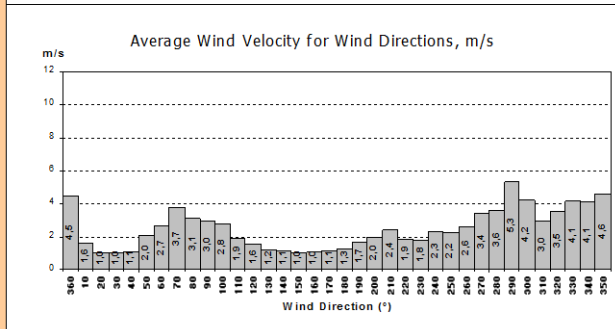
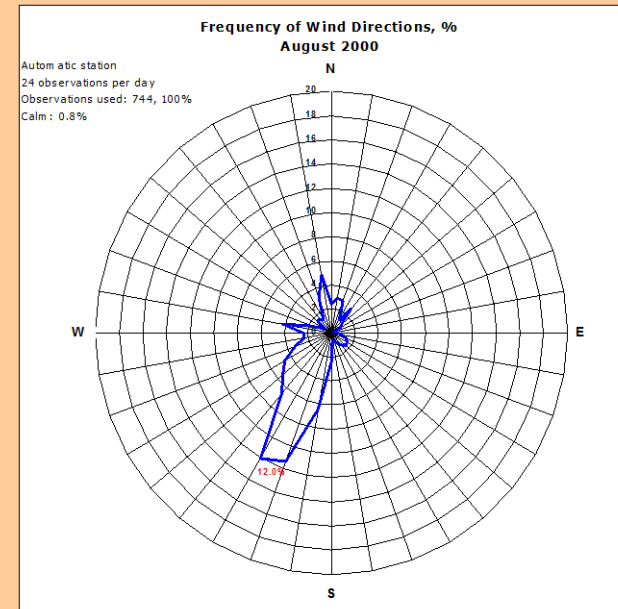
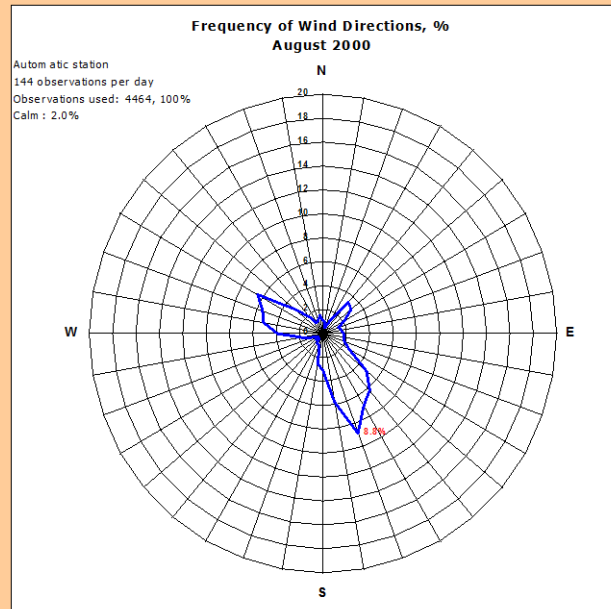
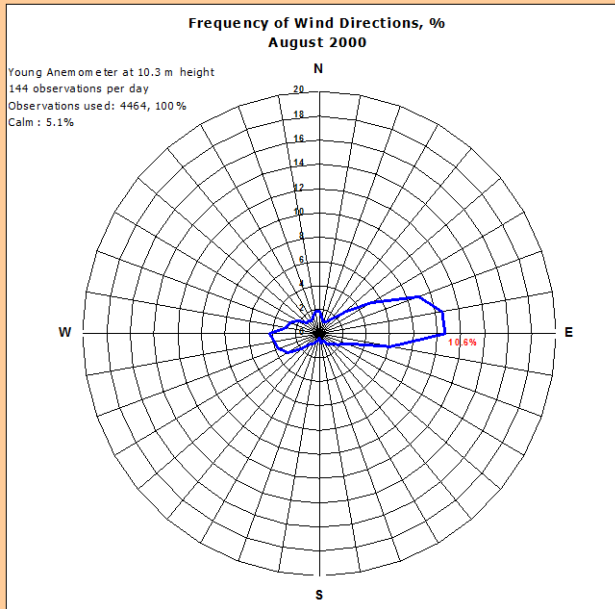


# August 2000

## Sómastaðagerði

## Vattarnes

## Seley





- Seley
- Skjól
- Maki
- Drönn

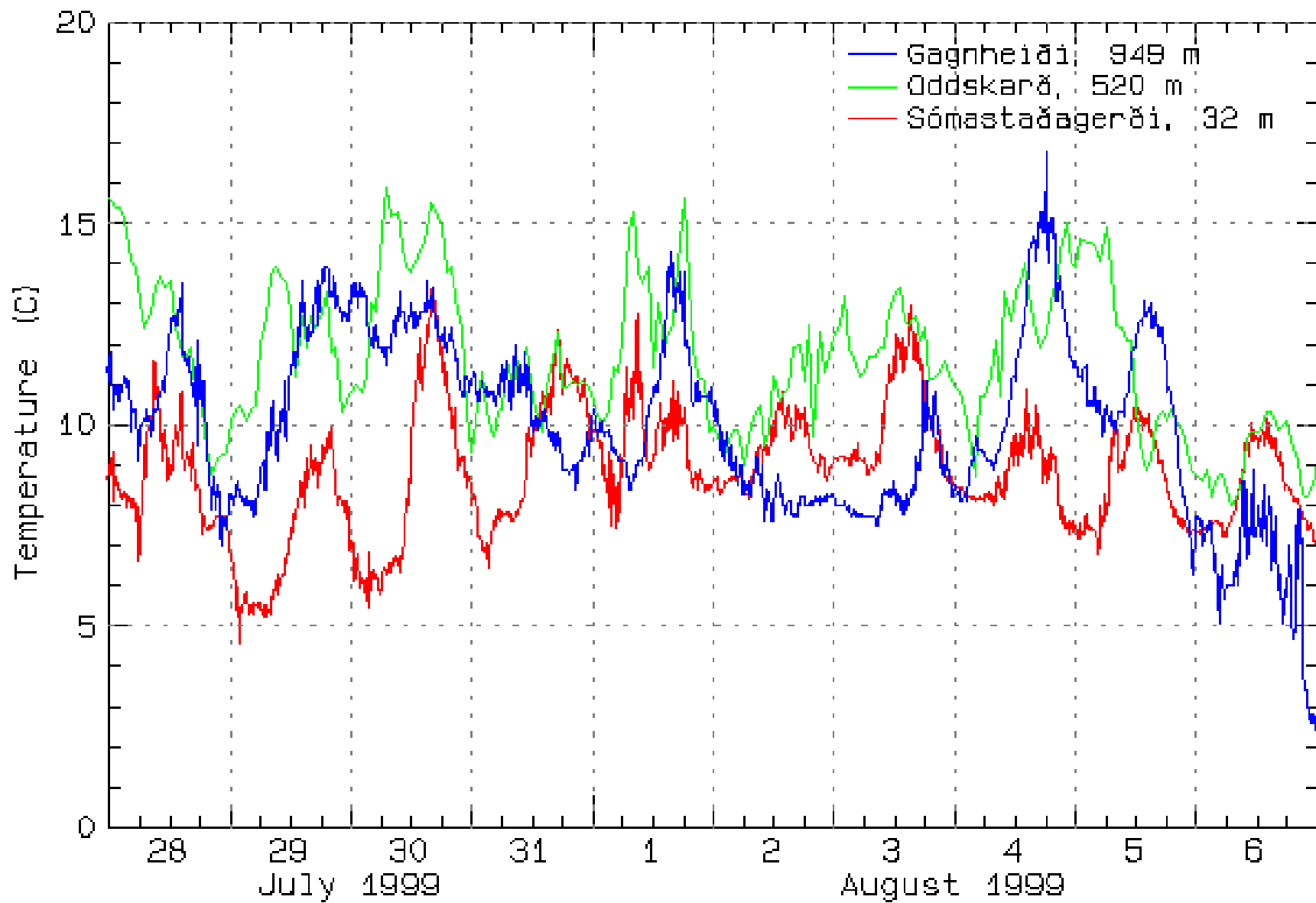
# *Temperature inversions*

*can act as a lid for dispersion of polluted air*

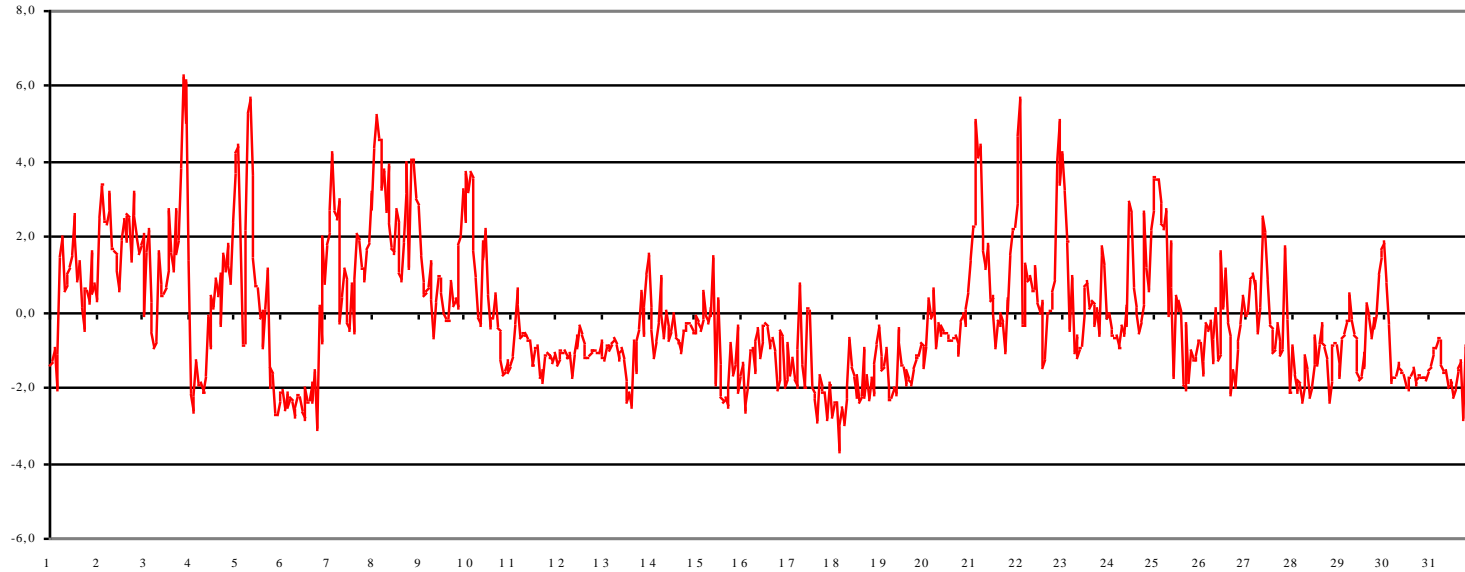
- *Normally air gets colder by about  $0.6^{\circ}\text{C}$  for every 100 m upward.*
- *For gradients  $>-0.5^{\circ}\text{C}/100\text{ m}$ , the air is stable and will tend to hinder vertical mixing.*
- *For gradient of  $<-1^{\circ}\text{C}/100\text{ m}$ , air is unstable and will aid vertical mixing.*



Oddskarð 1995-07 - 520 m

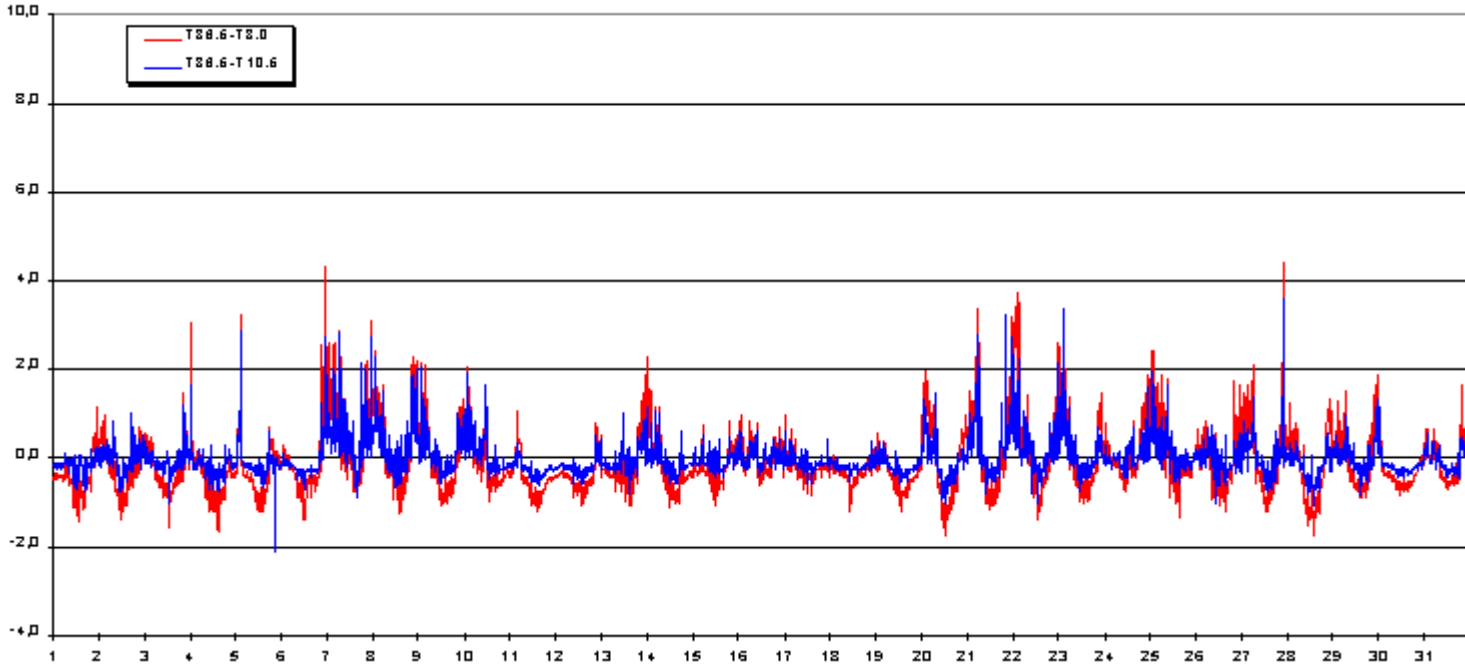


°C



August

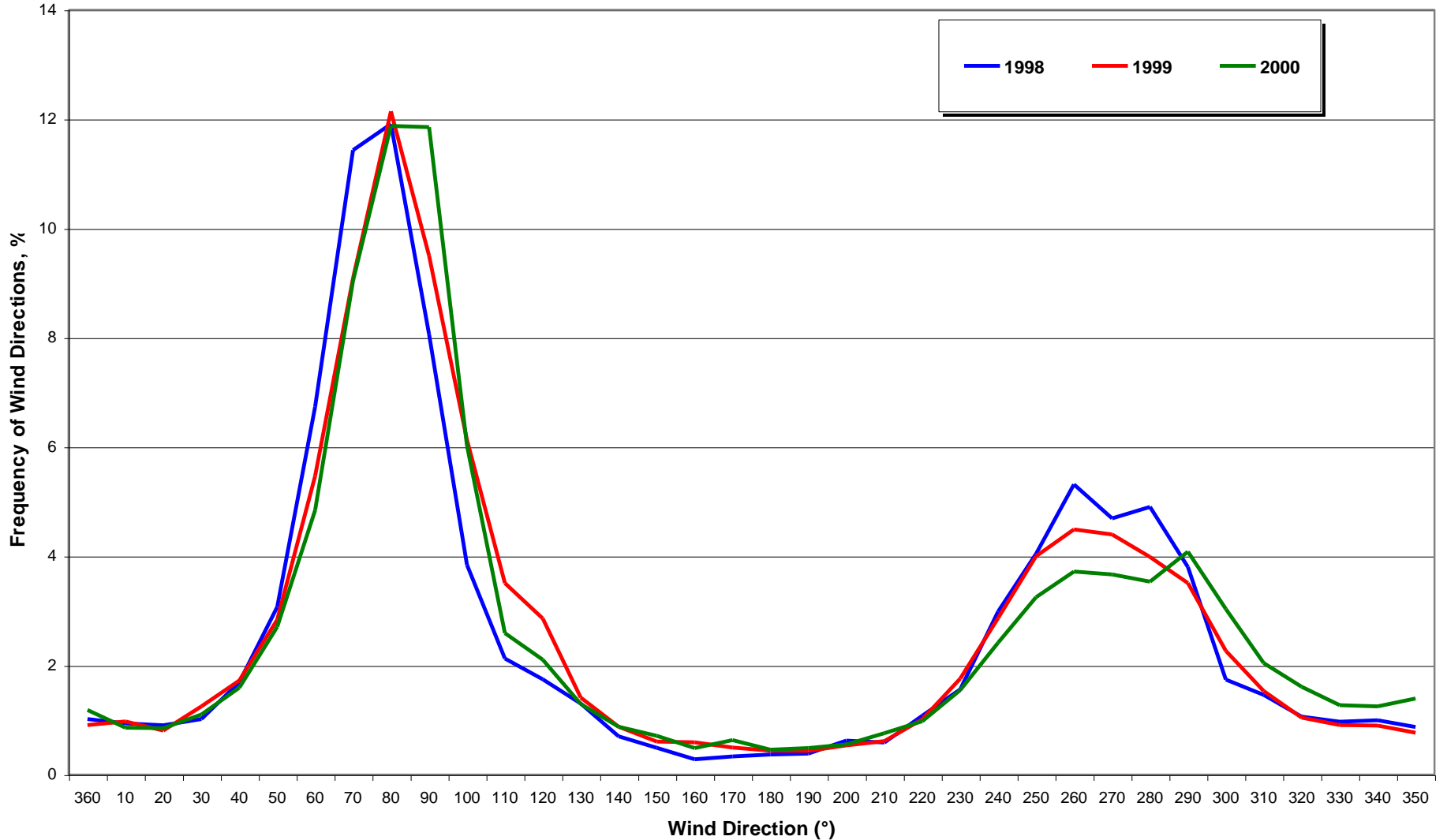
°C



*How typical are the last  
couple of years?*

# Sómastaðagerði 1998-2000

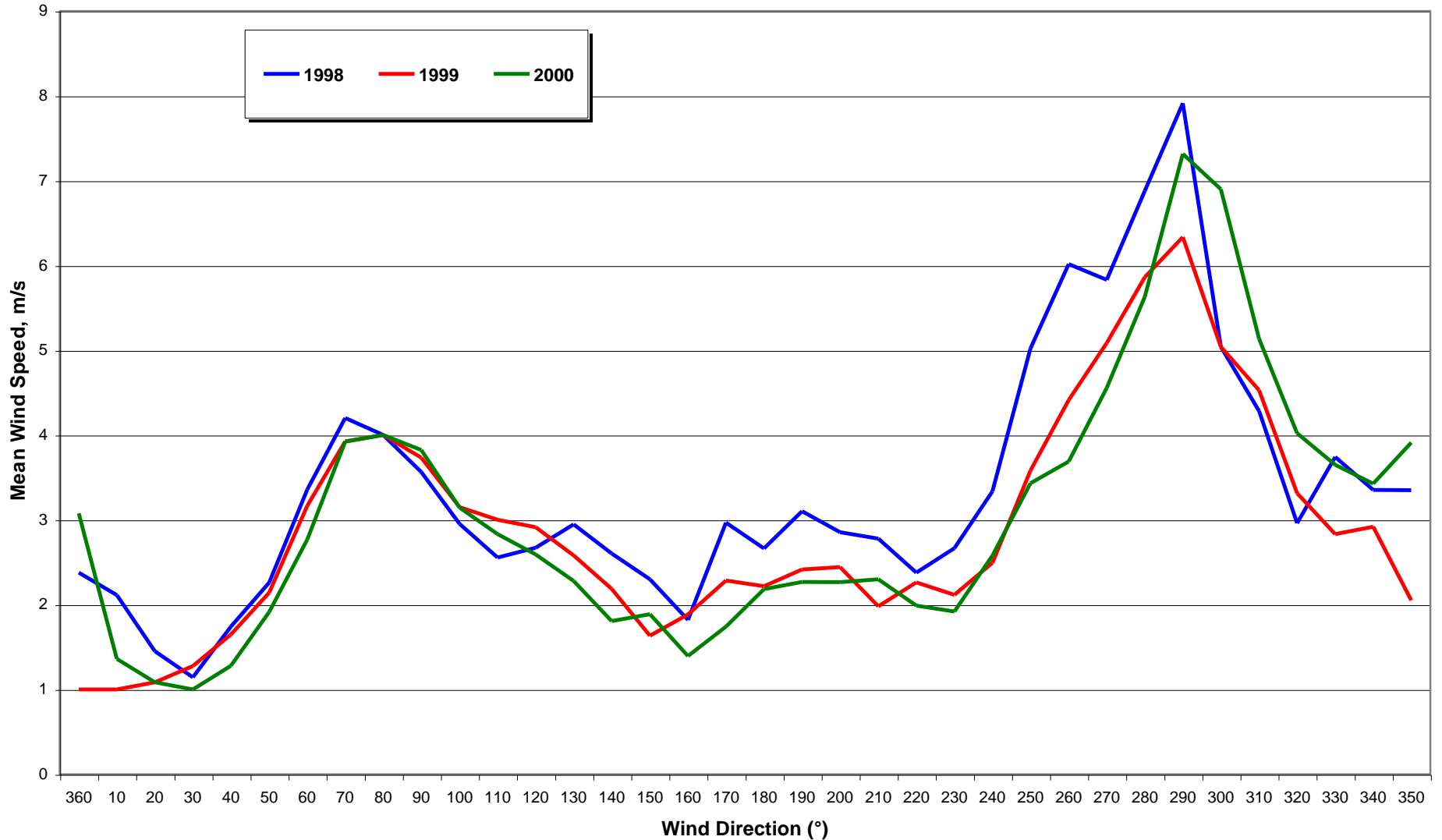
*Frequency of wind directions, May - August*



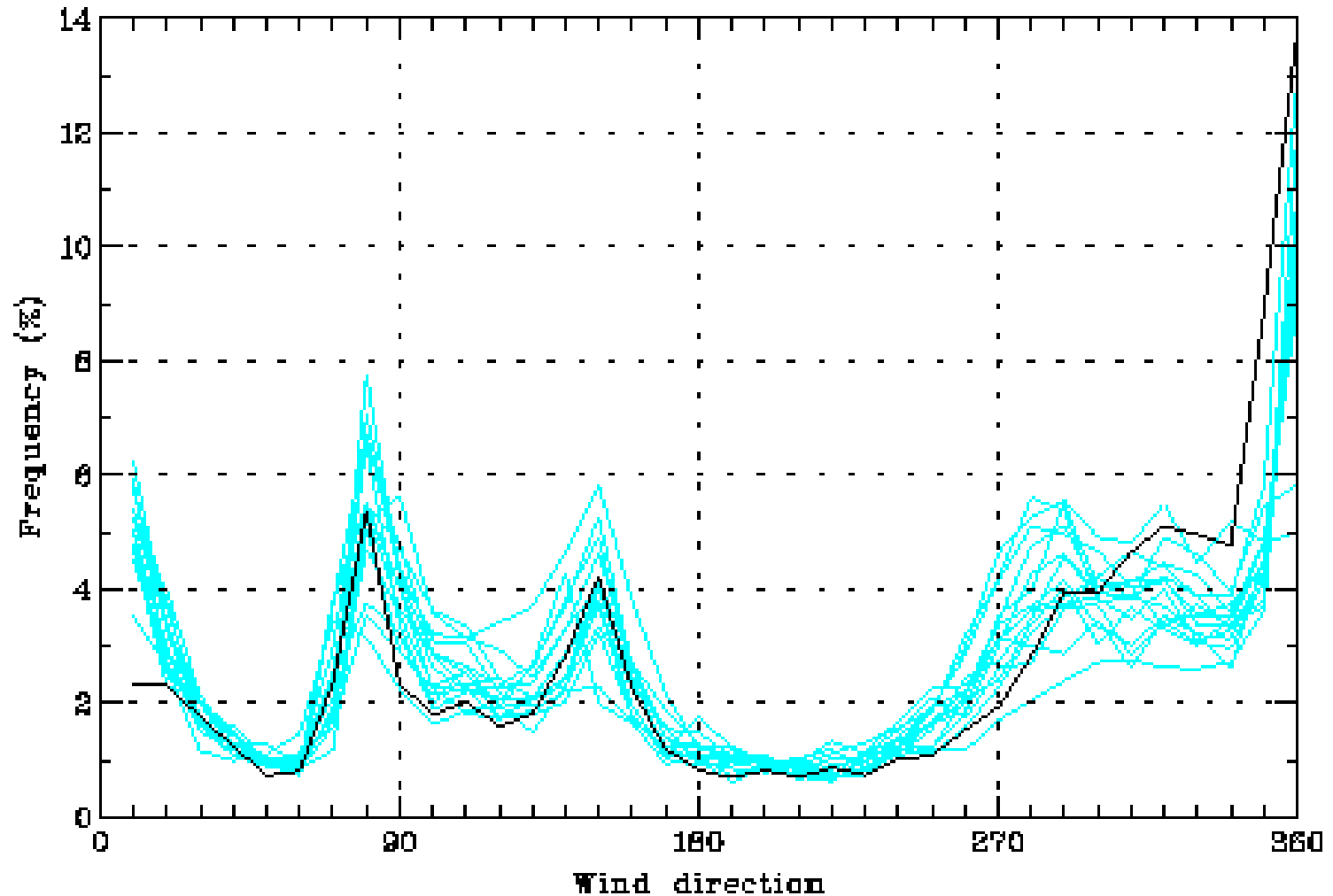


# Sómastaðagerði 1998-2000

*Mean wind speed vs direction, May - August*



# *Kollaleira 1983-1997 and May 1998 - April 1999*



# *Additional AWS since June 2000*

*Kollaleira - Ljósá - Vattarnes*

*Measurements recorded every 10 min*

- Air temperature at 2 m*
- Relative humidity at 2 m*
- Windspeed, gust and direction at 10 m*
- SD of windspeed and direction*



Kollaleira AWS 2000-06



Ljósá 2000-06 - 280 m

4 6:00

Ljósá

4 6'00





Vattarnes 2000-06

3 6'00



Vattarnes



# *Veðurstofa Íslands - Reports*

- *1986: Veðurathuganir á Reyðarfjarðarsvæðinu, 116 pp.*
- *1999-06: Vindmælingar að Kollaleiru 1983-1998, 41 pp.*
- *1999-08: Wind observations at Eyri and Leirur in Reyðarfjörður, 32 pp.*
- *1999-10: Wind and stability observations at Sómastaðagerði in Reyðarfjörður, May 1998 - April 1999, 55 pp.*
- *2000-01: Additional wind and stability observations at Sómastaðagerði in Reyðarfjörður, 36 pp.*
- *2000-05: Additional wind and stability observations at Sómastaðagerði in Reyðarfjörður II, November 1999 - April 2000, 33 pp.*
- *2000-09: Additional wind and stability observations at Sómastaðagerði in Reyðarfjörður III, May - August 2000, 64 pp.*