

# Wood and indoor climate

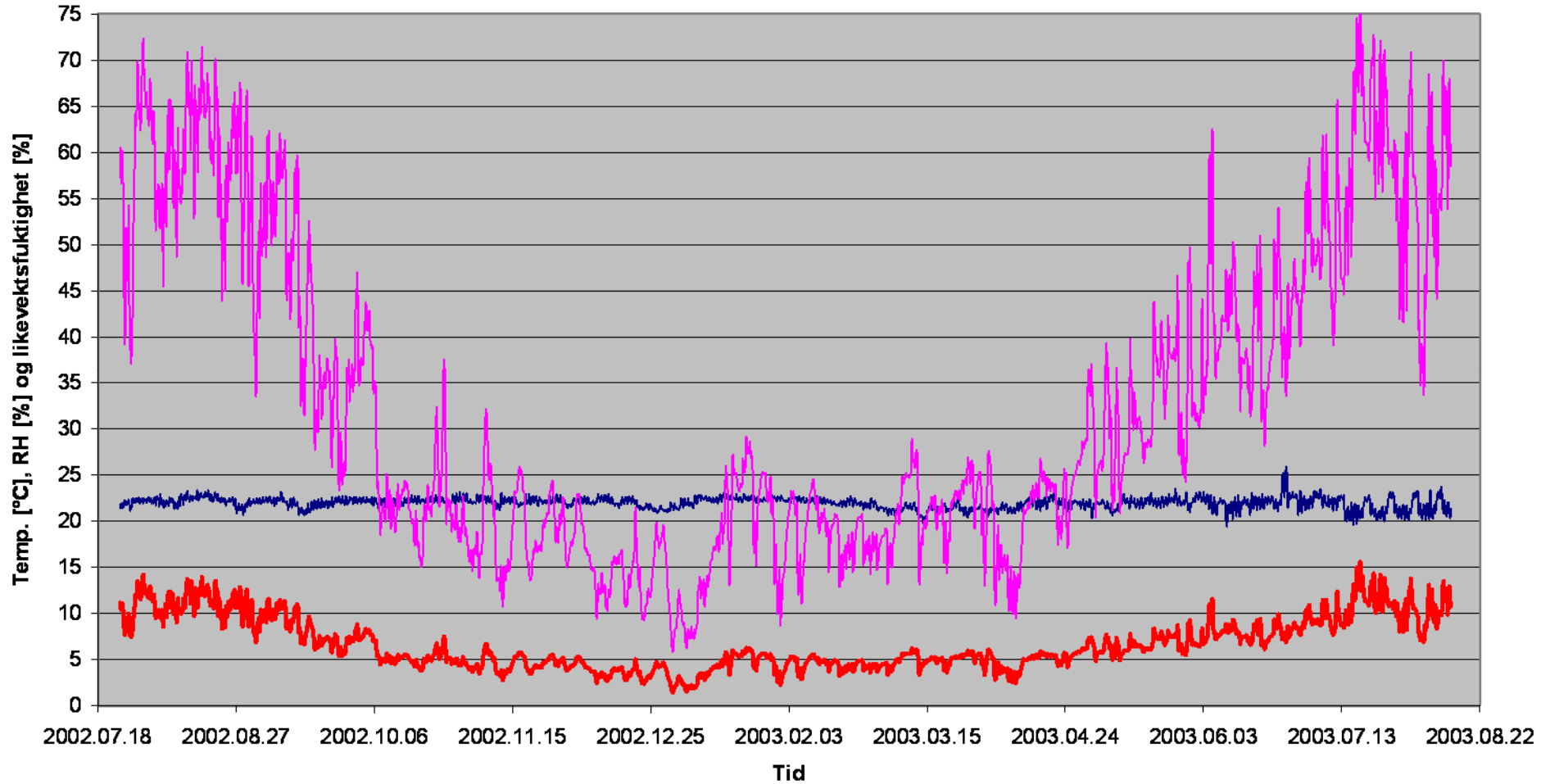
- **Fact: Most damages that arise in connection with wood are caused by moisture.**
- **How large are the geographical differences in indoor climate within a geographical area?**
- **Does producers of wood based products have an overview?**
- **Should the moisture content be more adapted to the area of use when producing larger structures?**

# Measurements performed by Norsk Treteknisk Institutt

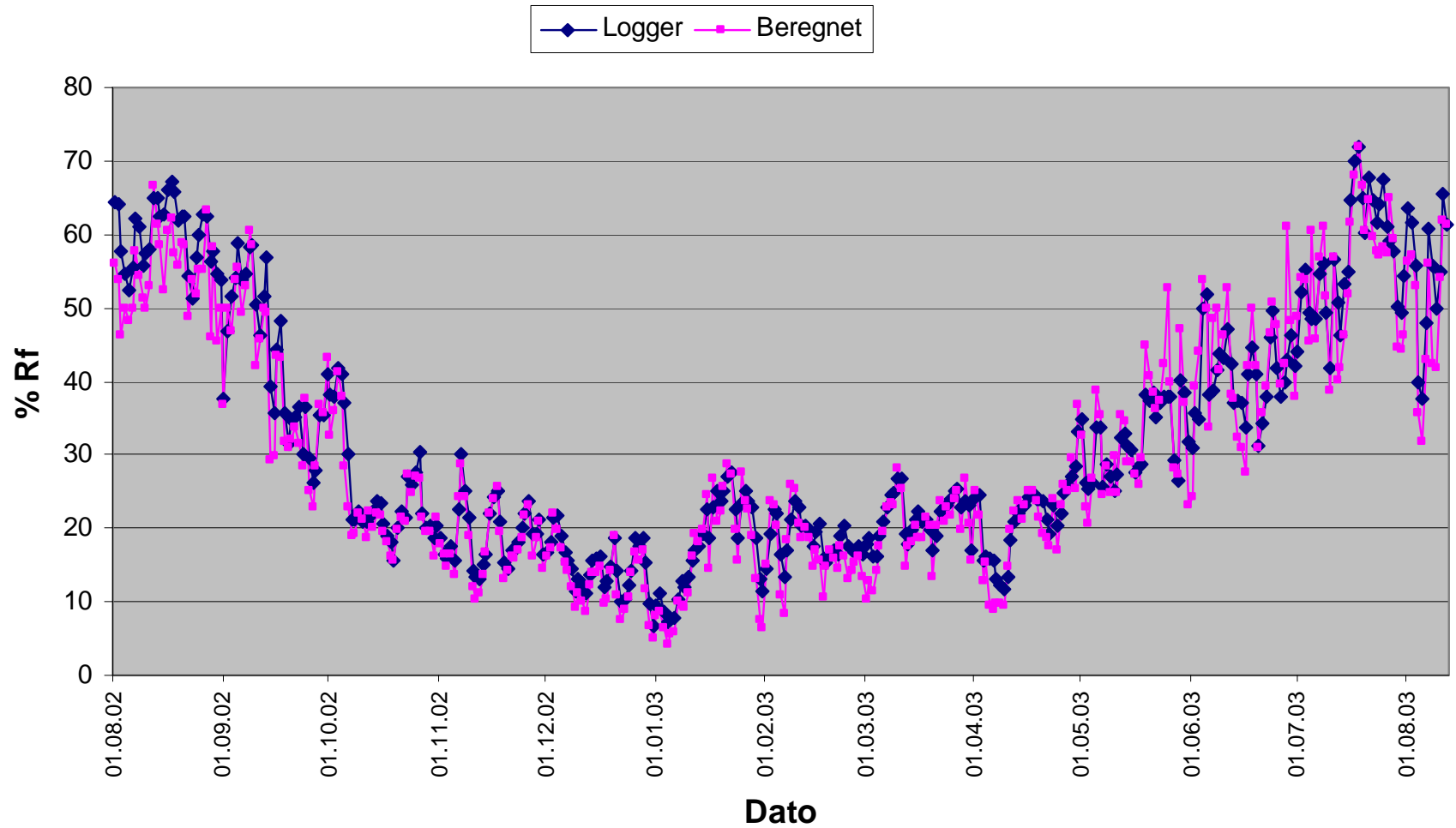
- **NTI has started an examination regarding indoor climatic conditions in Norway.**
- **Loggers have been placed and measuring data collected from various places.**
- **A "climatic scan" has been performed based on data from The Norwegian Meteorological Institute.**

# Logged values in a large office space in Oslo - 18 July 2002 to 22 August 2003

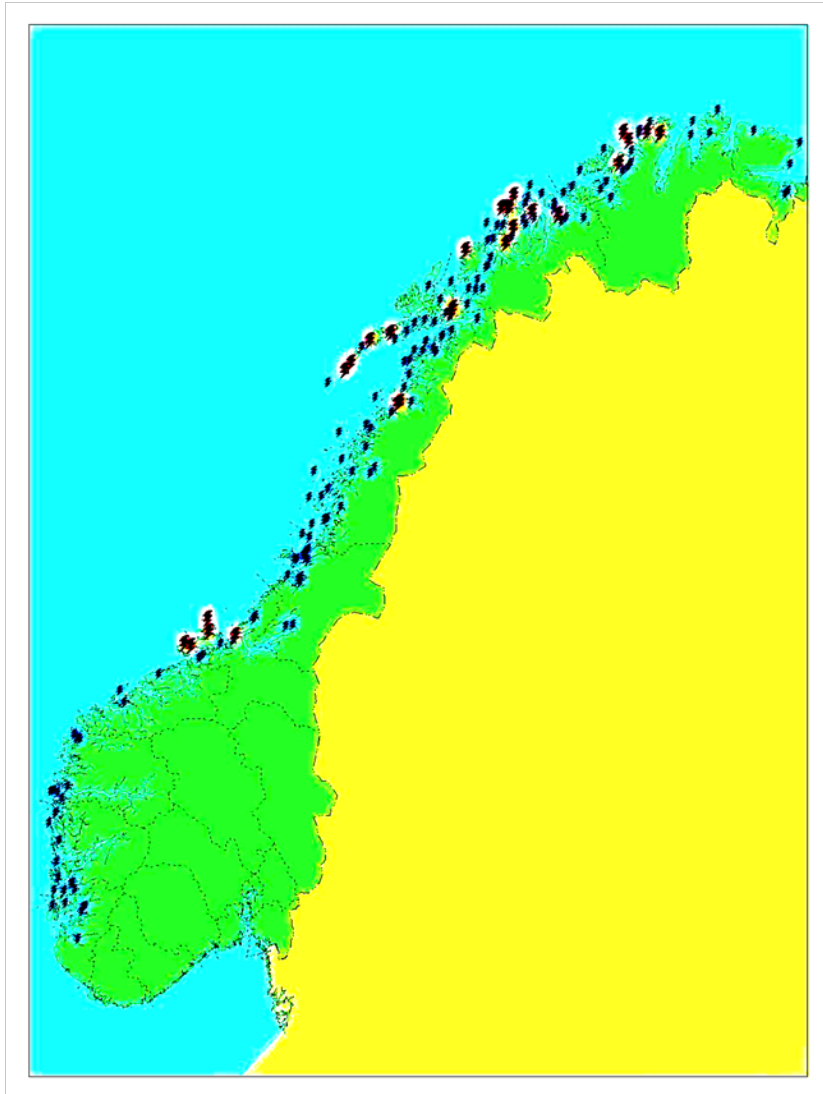
— Temperatur — Relativ luftfuktighet — Likevektsfuktighet



# Logged and estimated indoor climate

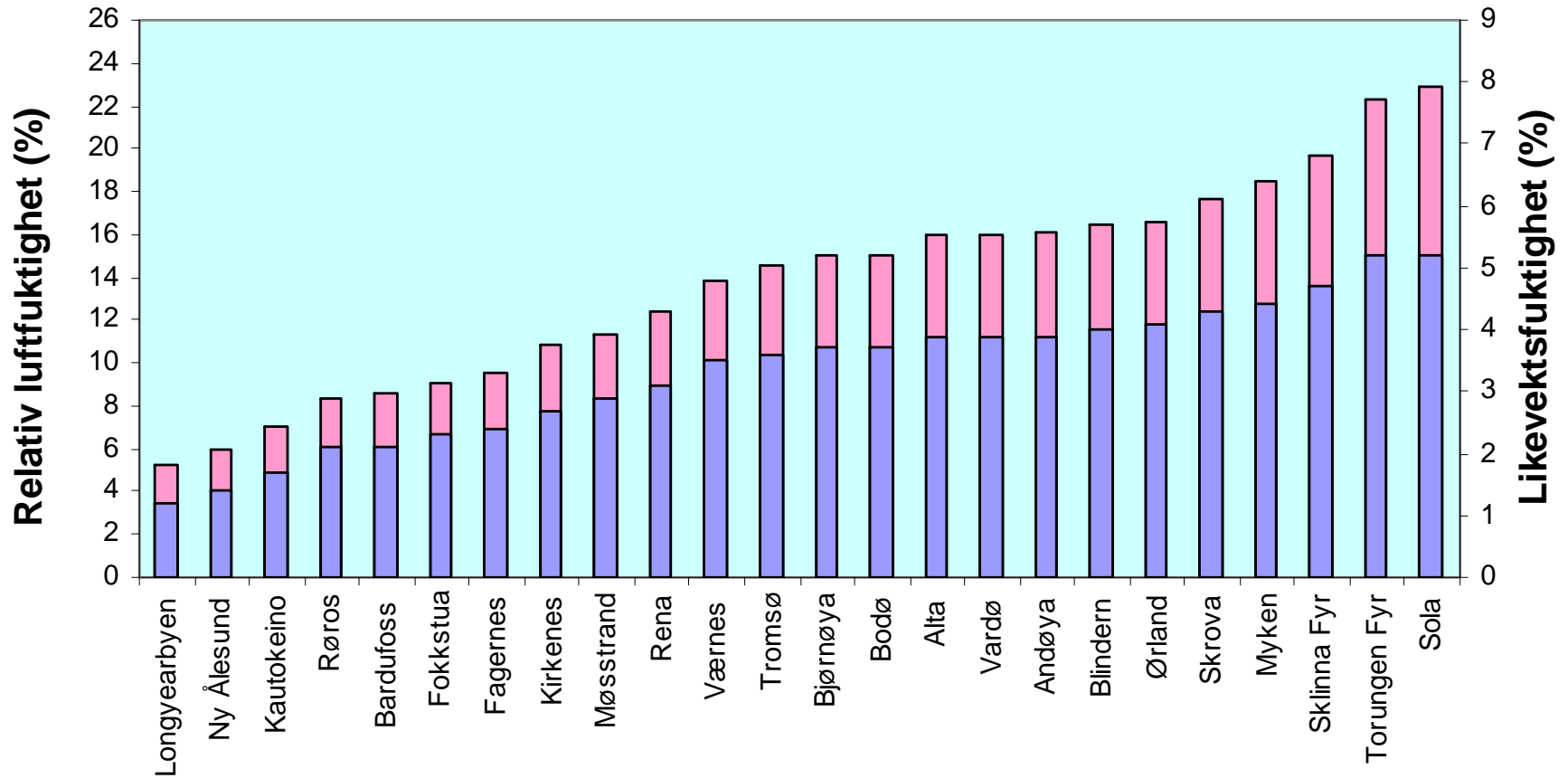


Norway – 58 to 71 ° north + Svalbard 78 to 81 ° north



Overview for January 2004 – indoor conditions at 22 °C (monthly mean)

Relativ luftfuktighet (%) Likevektsfuktighet (%)



# Examples of types of damages

- **Delaminations and formation of checks in floors.**
- **Windows and doors are "bulging".**
- **Formation of checks and delaminations in glulam structures.**
- **Increased stresses in joints and other connections/fastening points in large structures.**
- **Larger dimension changes than expected (a glulam arch can change its radius depending on the moisture content).**

# Examples of exposed products

- **Floors – parquet and solid tree**
- **Windows and entrance doors**
- **Glulam structures**
- **Elements of solid timber**

# Structure - Iceland



# Nardo School – solid wood elements

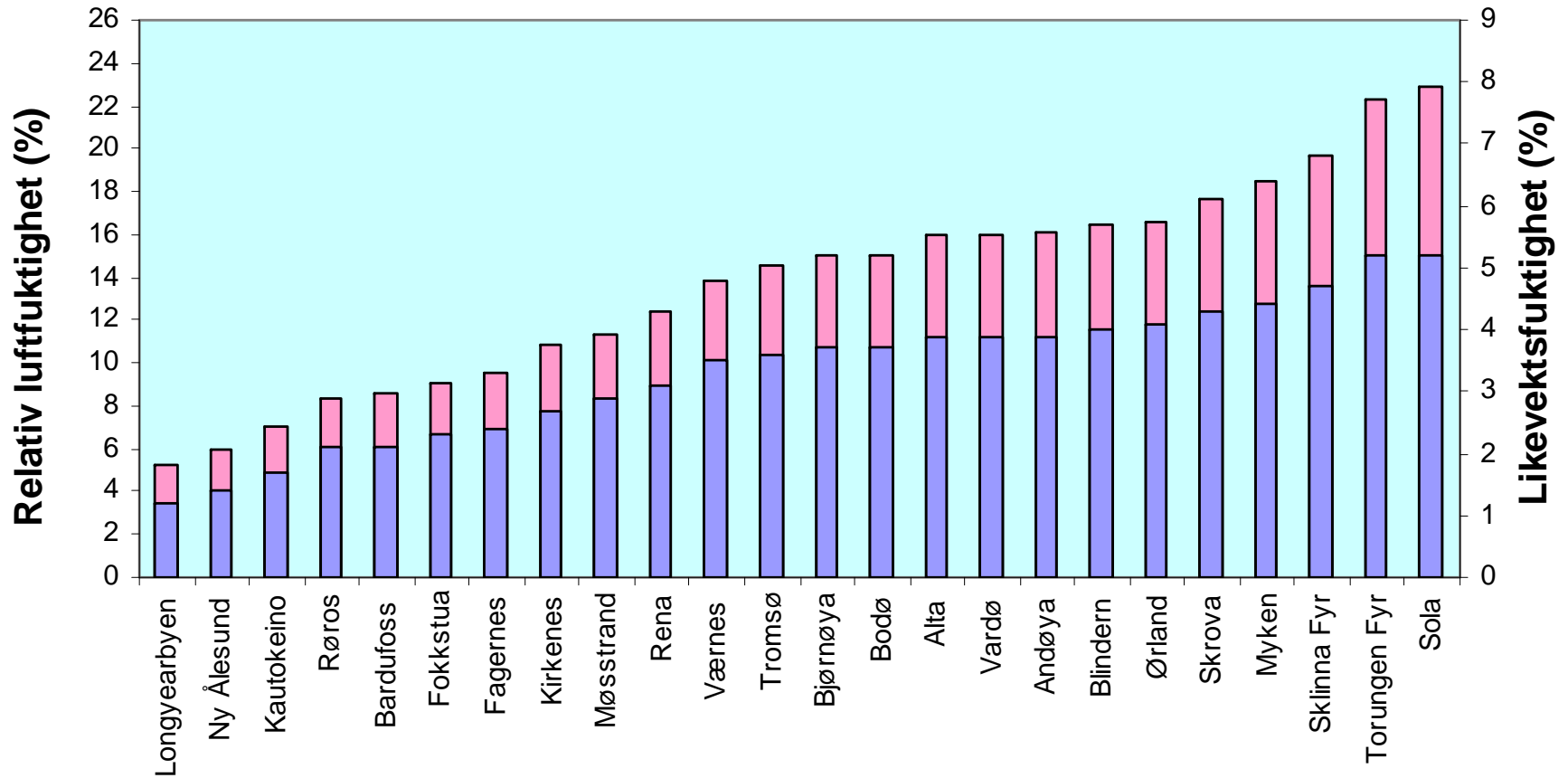


# Forskningsparken on Svalbard



Overview for January 2004 – indoor conditions at 22 °C (monthly mean)

Relativ luftfuktighet (%) Likevektsfuktighet (%)



# Forskningsparken in Longyearbyen



# The University on Svalbard



# Glulam beam - Longyearbyen





## UNIS – Longyearbyen

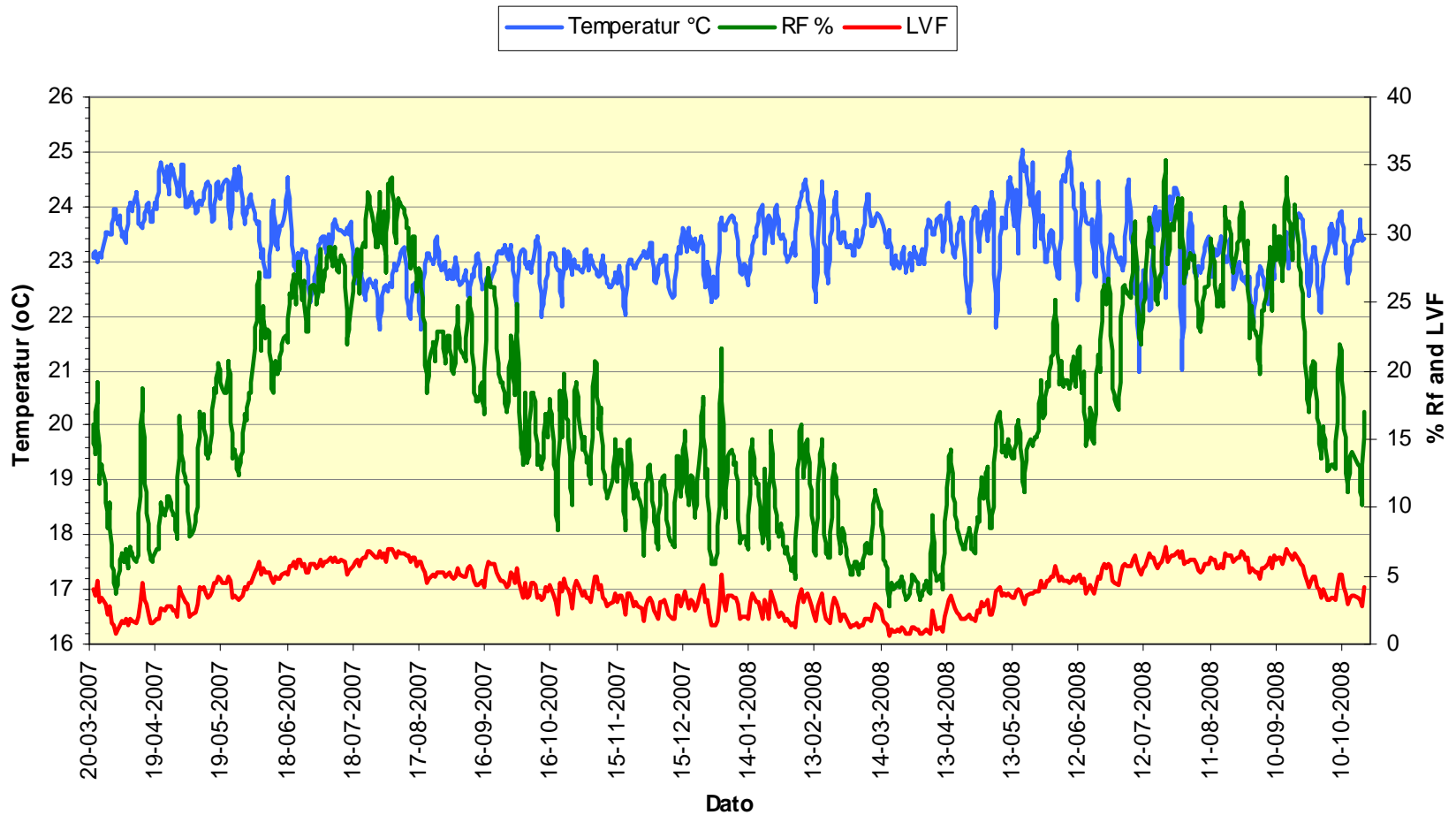
# The University on Svalbard – Svalbard Museum



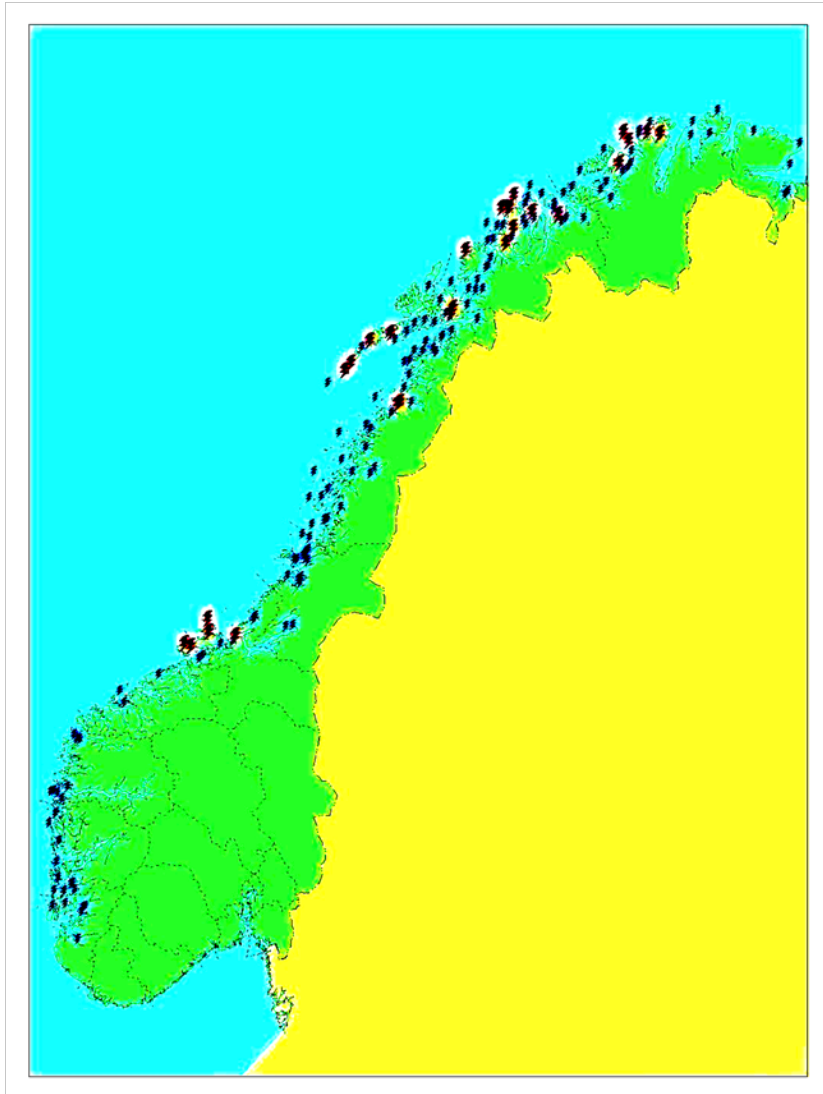
# Logger



# Logged indoor climatic conditions in the university building - Longyearbyen



Norway – 58 to 71 ° north + Svalbard 78 to 81 ° north



# Risenga indoor swimming pool – Asker



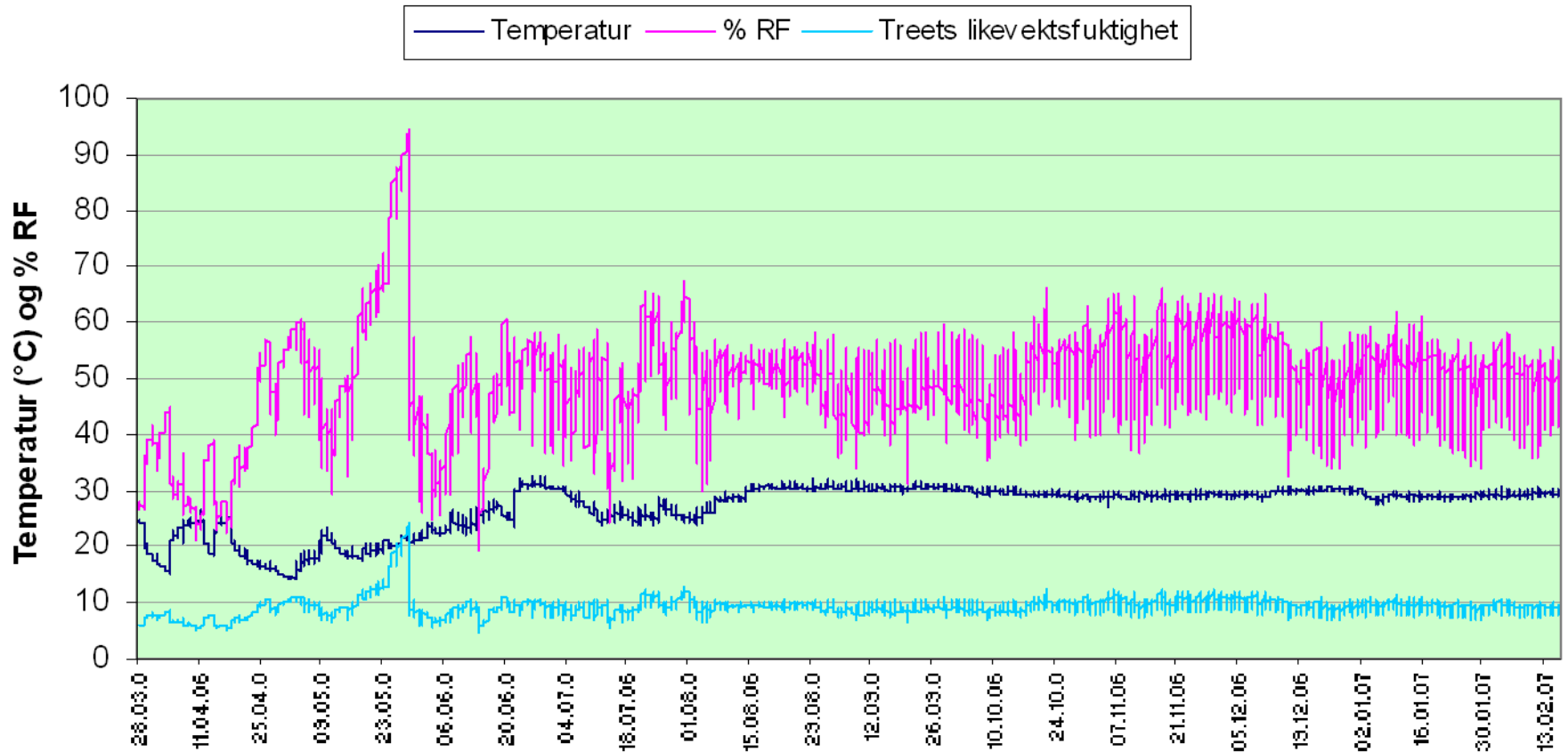
# Risenga indoor swimming pool



# Climate in Risenga indoor swimming pool – Asker

Logging for the period 28 March 2006 to 16 February 2007

The measurements have been done up below the ceiling near the glulam beams

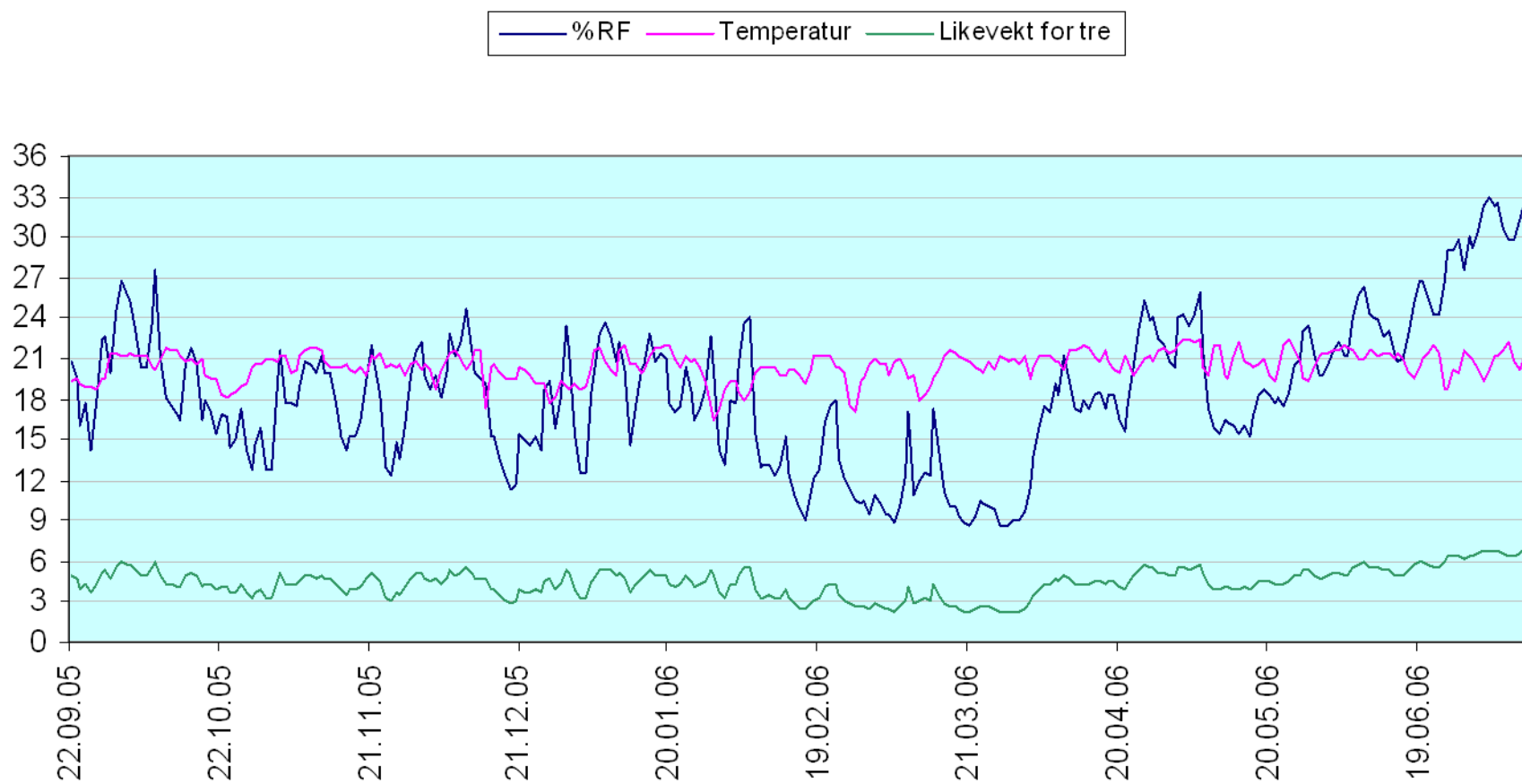


# Longyearbyen School



# Logged indoor values at Longyearbyen School

Daily mean from 22 September 2005 to 11 July 2006



# Indoor climate in Oslo and in Longyearbyen for the period 22 September 2005 to 4 April 2006 (cold season)

Actual outdoor values converted to indoor conditions in Longyearbyen and Oslo + logged indoor values at Longyearbyen School. The values are a mean for the period.

	<b>Inneforhold</b>		
	<i>Temperatur</i>	<i>% RF</i>	<i>% LVF</i>
Estimated for Oslo	22,0	22,3	5,0
Estimated for Longyearbyen	22,0	12,7	3,1
Logged values for Longyearbyen	20,3	16,7	4,1

# Foundation for house in solid timber



# Solid timber used on Svalbard



# Interior – solid timber – Svalbard



# Logger placed on the research station Troll in Antarctica

**Parquet of heat-treated birch – shall tolerate low RH over time.**



# Further work

- **A larger project is planned to increase the knowledge of the variations in question in Norway.**
- **Loggers will be placed on selected places in office spaces and in homes. Actual data for an entire year shall be collected.**
- **As a result one can make a "climatic chart" that can be used when special attention regarding working climate is necessary.**