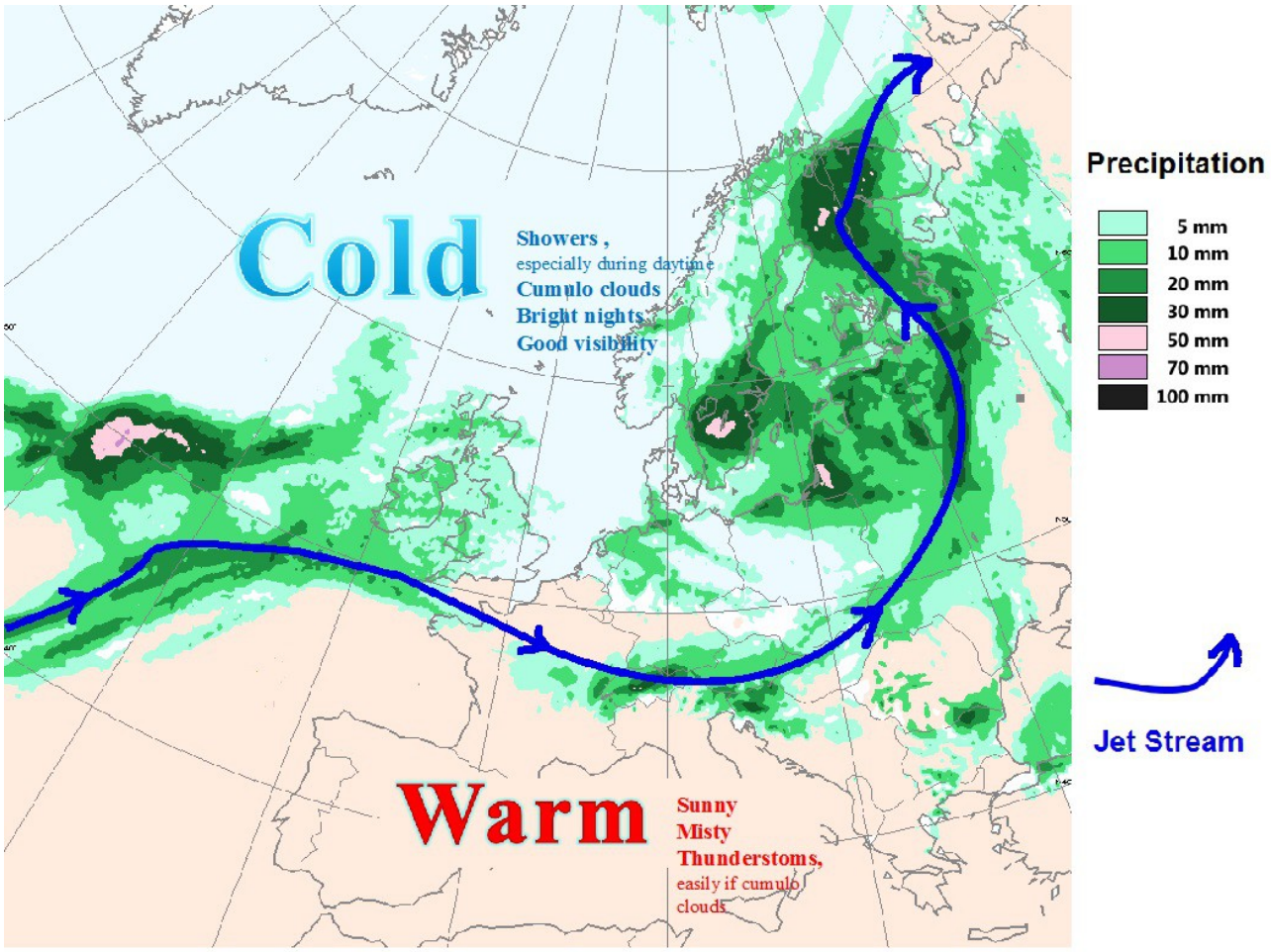
Short introduction to gliding weather in Finland

Climate in Finland

Finland belongs to region of westerly airflow. This airflow is caused by area of high temperature gradient in south-north direction, usually known as polar front. Polar front divides air masses to warm *mid-latitude airmass* that reaches middle Europe, and cold *polar airmass* that extents to higher latitudes. Areas of high temperature gradient causes jet stream and baroclinic instability that triggers low pressures. They move with westerly wind from north Atlantic to Scandinavia and Finland. During summertime polar front has often moved to north of Finland or interrupted by high pressure systems.



During unstable weather type with low pressure activity, strong westerly winds move the low pressure areas to Russia quite rapidly, usually in 12-24 hours. Between low pressure systems narrow high pressure ridges provide good gliding weather. However, if airflow is from south to east, it is often very weak and consequently low pressures move at frustratingly slow pace, and can even park over Finland for several days. In addition, southerly wind usually brings warmer air and this warm advection means that convective conditions remain weak. It should be noted that forecasting in south-easterly airflow is notoriously difficult.

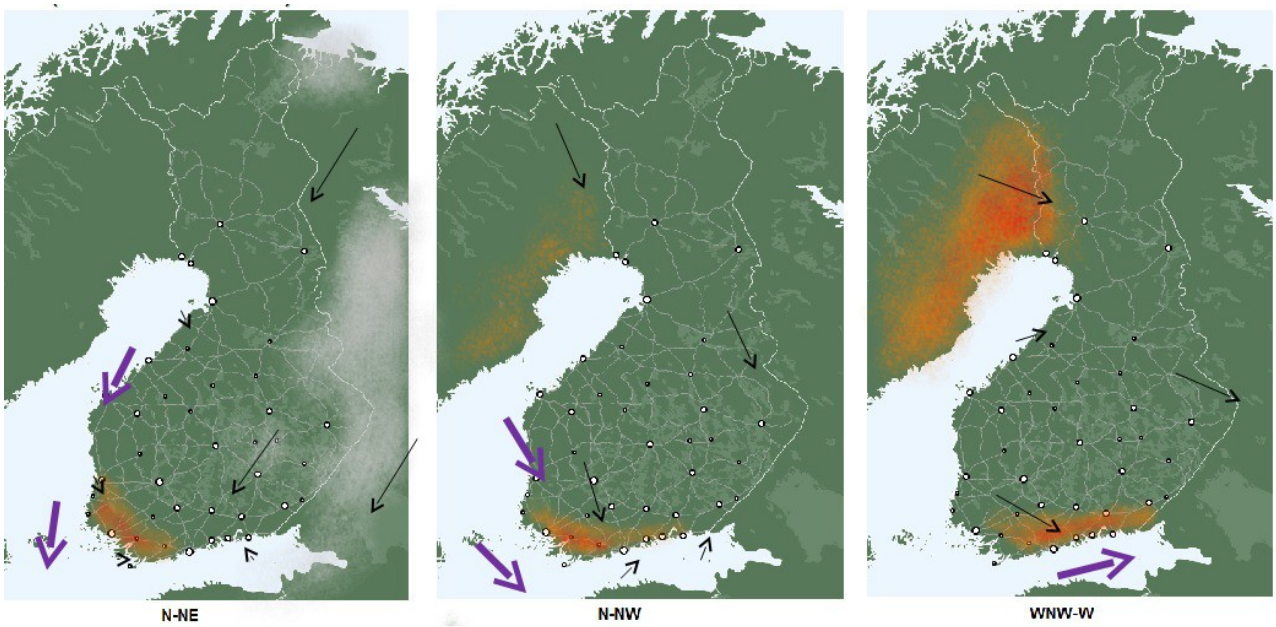
During summertime high pressure activity consists of narrow high pressure ridges passing over Finland in westerly airflow, but also larger and slower moving blocking-type highs that can cover whole northern Europe. These blocking highs can provide good soaring conditions even for couple of weeks. Best-case scenario is high pressure centre over Norway or Sweden so that airflow in

Finland remains from north-west. High pressure provides dry air and subsidence inversion that gives us high cloud bases and no risk for over-development.

Airflow and typical gliding weather

Typically best gliding conditions are achieved in polar airmass with westerly to northerly airflow. Cold airmass means that surface temperature is not particularly high, but convection usually starts early, is strong and lasts until late evening. Because of the strong convective conditions polar airmass requires a weak high pressure ridge or dry air to prevent spreading out or over-development Rain showers in cold airmass are usually small-scale and don't necessarily prevent flying.

Airflow from north to east can be sometimes problematic. Cold polar airmass coming from north-east usually stays very close to ground. This cold air is capped by inversion layer usually at 1000-1500 m altitude. With dry north-eastern airflow this leads to dry thermals, if there is any moisture below inversion spreading out and sc-layers are typical.



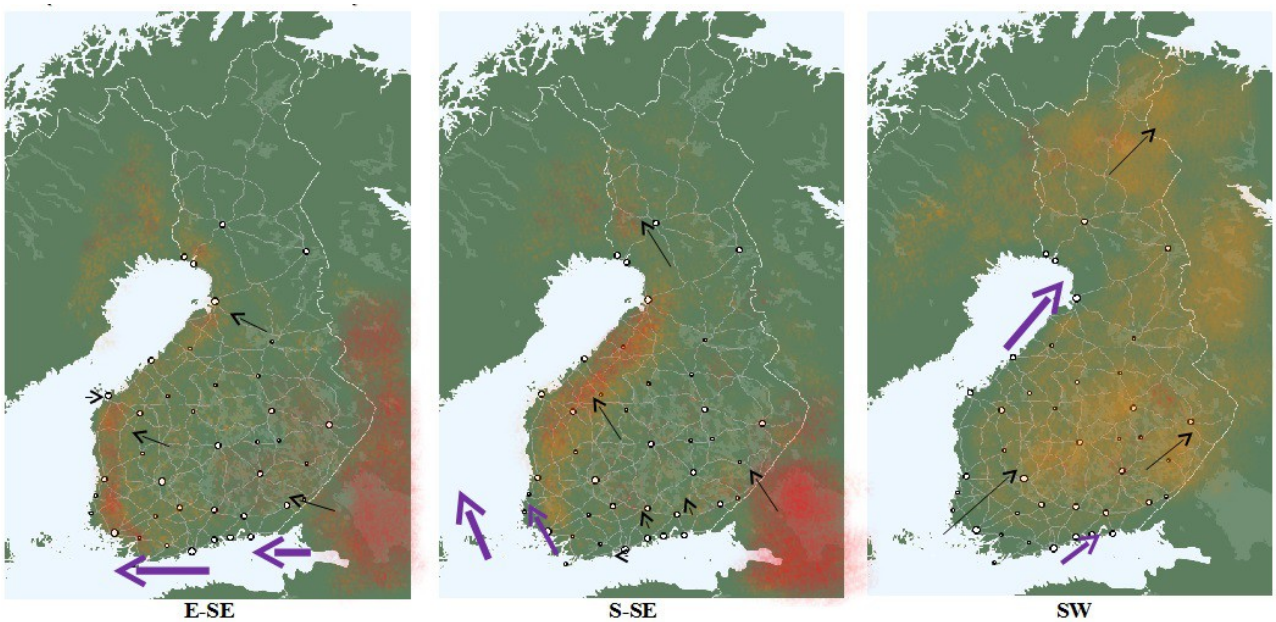
N-NE

- Inversion capping convection
- Possibly sc- or ac-sheets coming from NE
- Sea breeze at south and west coast
- Good visibility
- Warmest air close to south-west coastline

N-NW and WNW-W

- Generally very good gliding weather with excellent visibility
- Warmest at southern Finland
- Sea breeze at south coast
- Occasionally spreading out (moisture and inversion) or over-development (moisture, weak low)

When airflow is from south we have mid-latitude airmass. Thermal strength is weaker than with polar airmass, and gliding conditions start little bit later. Moist air leads to lower cloud bases, though long flights are still possible. In very warm airmass (T850 over 10 degrees, surface temperature over 25 degrees) convection is usually not very strong. Thunderstorms are frequently observed in warm southerly airflow and weak low pressure system.



E-SE and S-SE

- Thunderstorms forming in Russia and Baltic can move into Finland
- In case of high pressure: stable airmass and weak convection
- Southern coast mostly clear because of the cold sea
- Convection starts late

SW

- With strong wind south and west coast stays clear, late afternoon cold air moves inland
- Often good gliding weather. Most common wind direction

Local weather patterns

Gliding weather in southern Finland is quite homogeneous, as elevation differences are very small, elevation is between 50 to 150 m ASL in the competition area. Large bodies of cold water, such as Baltic sea and bigger lakes cause local areas of weaker thermal activity. They are usually well marked by absence of any cumulus clouds. Over the cost of Baltic sea classic sea-breeze circulation develops when convection is strong and airflow is from land. This means that wind direction is usually from north, or wind strength is very weak. Sea-breeze front usually stays close to shore and is well marked with dropping cloud base. Bigger problem is strong airflow from the sea. Classic sea-breeze circulation does not develop when wind is from the sea, but in that case cold air from the sea also spreads out further inland, and during late afternoon or evening cold sea-air can penetrate over 50 kms inland. In competition area southern and western cost of Finland can pose a problem. Usually in westerly airflow it is possible to fly close to cost at noon as the cold air has not travelled inland yet. If there is over-development over land you can also take advantage of the cold sea air. Weather stays clear over the sea so the first clouds close to the shore can work even if there is total

spread-out inland.

Bigger lakes form a pocket of cold air over them. There is no convection in these pockets, and wind can move them downwind. If you have to cross bigger lake in dry conditions, notice the wind directions. Downwind shoreline is the worst place to fly, the high temperature gradient at upwind shoreline can however trigger thermals that can be carried by the wind to the middle of the lake. I haven't observed sea-breeze circulation close to the lakes during 20 years of flying. Technically they can form, but I don't see and advantage to be gained from them.

Soil type in competition area

It might be a good idea to know few facts about soil types in competition area. Two of the most important soil types are moraine (sort of mixture of gravel and sand, often formed in long eskers) and clay. Main interest for glider pilots is their ability to hold water. Morain lets water trough quickly, and is therefore dry, and heats up effectively. Clay can hold water for long periods of time and is relatively cold and wet.

Moraine eskers are usually covered with pine forest, and often dotted by yellow-brown sandpits, areas where sand and gravel are being extracted. Good thermal hotspots are also clearings at forests where wood has been logged. There are a lot of them, a not all of them work, however. As moraine eskers don't suffer from ground frost, it is very cheap to build infrastructure over them. Therefore most of the small airfields are built over them (Räyskälä included), as are many highways, and for unknown reason, all the army shooting areas (certain thermal hotspots, if any).

Areas of clay soil are spotted by large fields and agriculture. Biggest areas of clay soil are situated 30-70 km south-west and west from Räyskälä. There are lots of big out-landing fields, and the lakes and rivers have light brownish colour that is good sign of clay. In a good day there isn't a great deal of difference in convection over different soil types, but when weather gets trickier it might be good idea to try to find thermals somewhere else than close to largest fields near to rivers.

29.5.2013 Kristian Roine (pictures by Petri Takala)