Meteorologisk institutt

# Temakveld Tromsø Flyklubb: Vær og værvarsling

Sevim M.-Gulbrandsen (statsmeteorolog)

*

# Innhold

- Analyse-kart
- Diverse prognoser
  - IGA
  - Sigkart
  - Høydevinder
  - Turbulensvarsel
  - Sigmet
  - Airmet
- Nyttige linker



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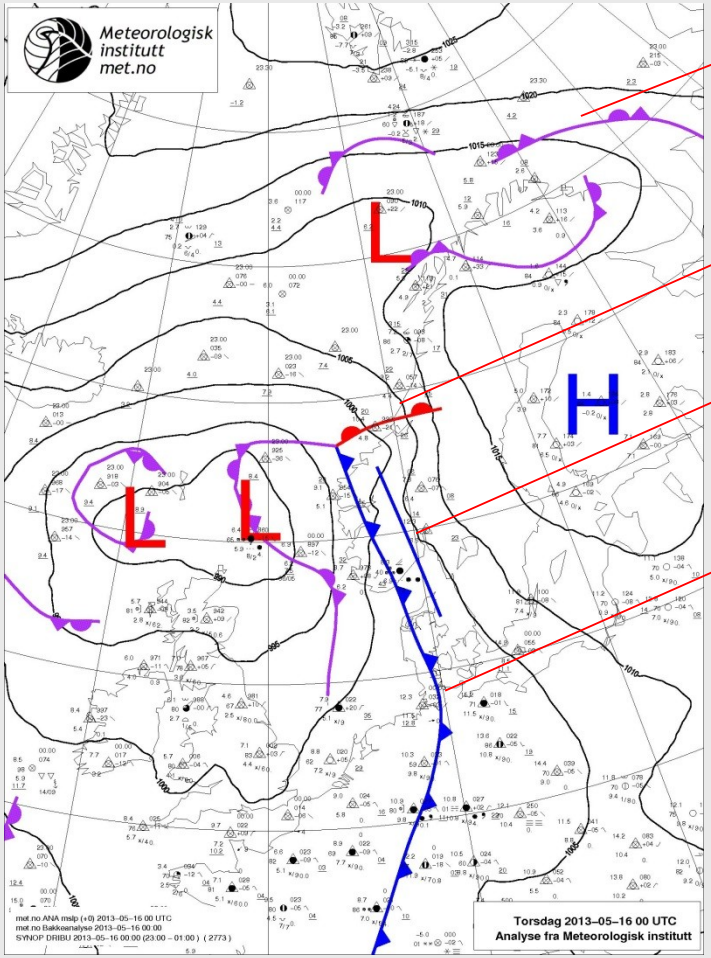
- De fleste kart utstilles 4 ganger om dagen:
  - 00z
  - 06z
  - 12z
  - 18z

- Det er både automatiserte kart (f.eks. høydevind) og manuell lagete kart (f.eks. analyser og sig.kart)

# Analyse Meteorologisk institutt

H: Høytrykk
L: Lavtrykk




Okklusion

Warmfront

Tråg

Kaldfront



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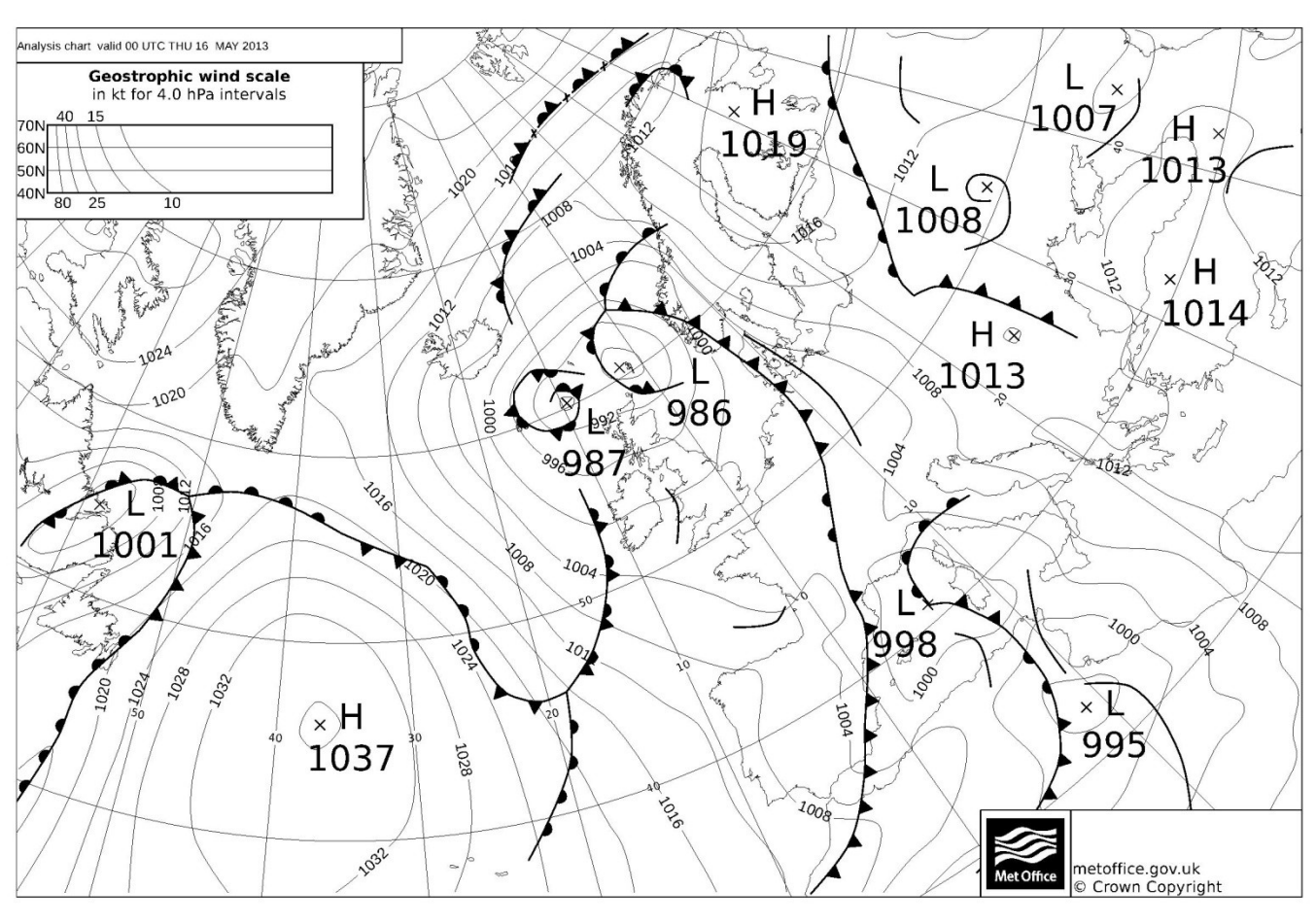
# Analyse UK Met Office



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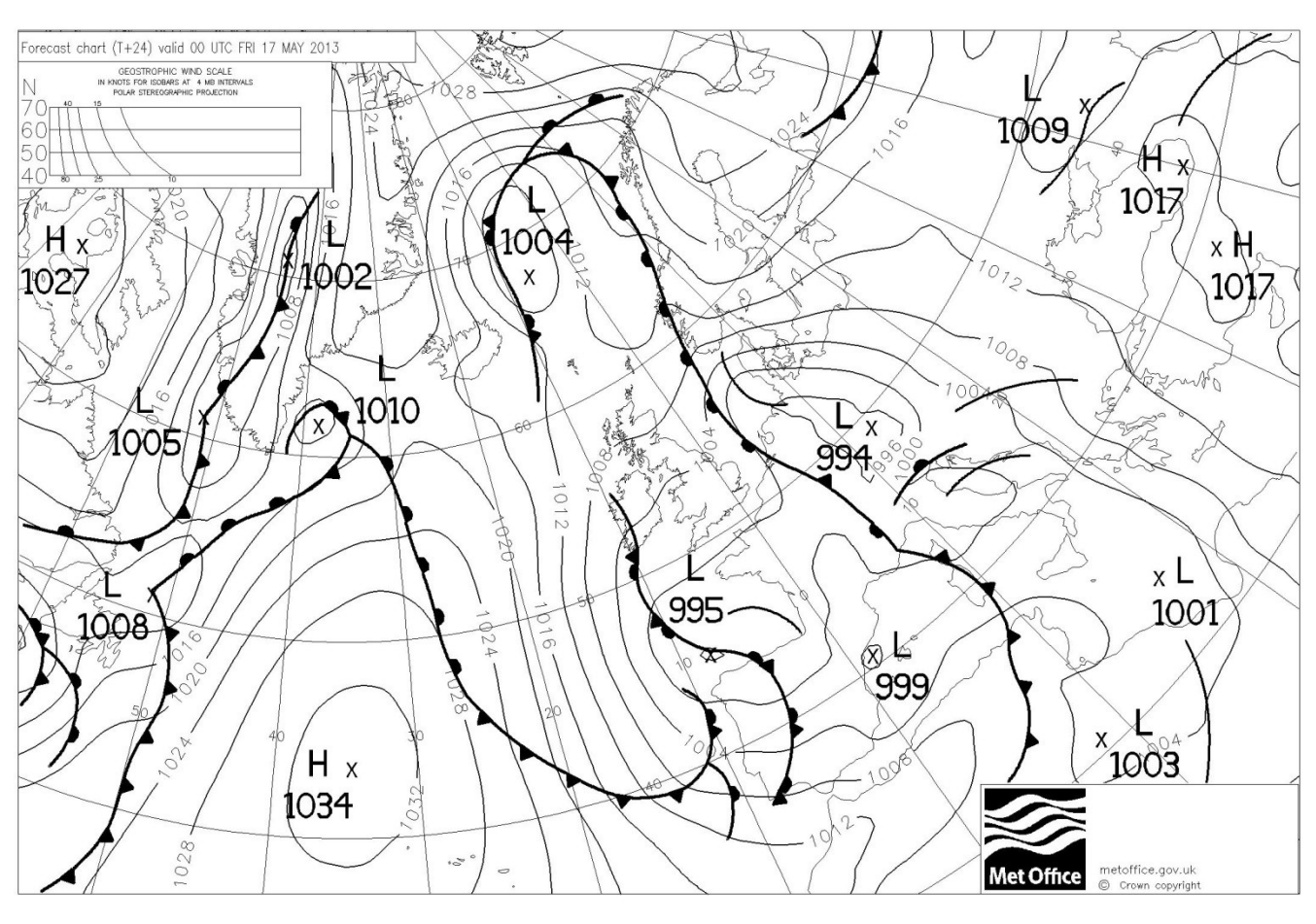
# 24 h Prognose UK MetOffice



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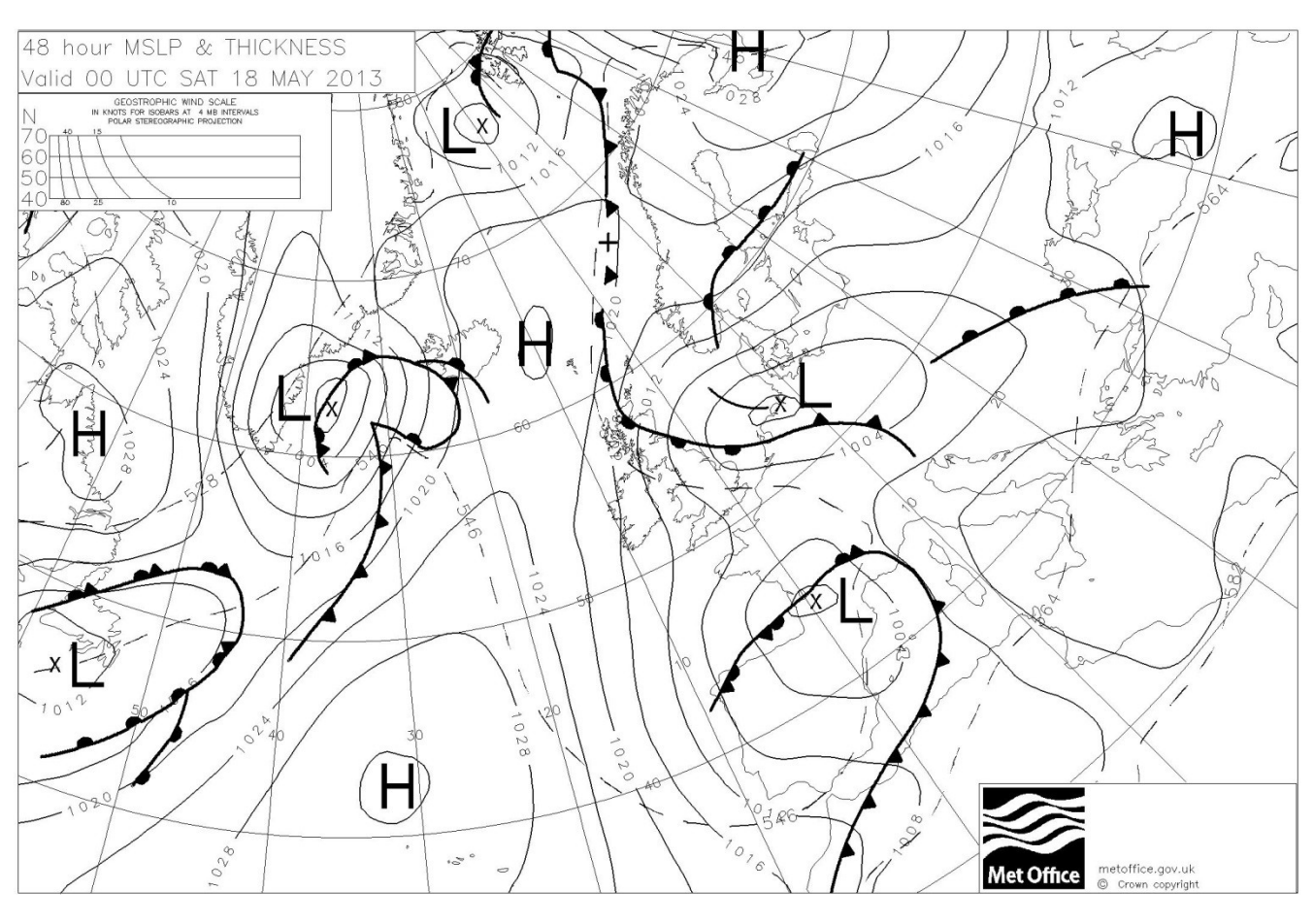
# 48 h Prognose UK MetOffice



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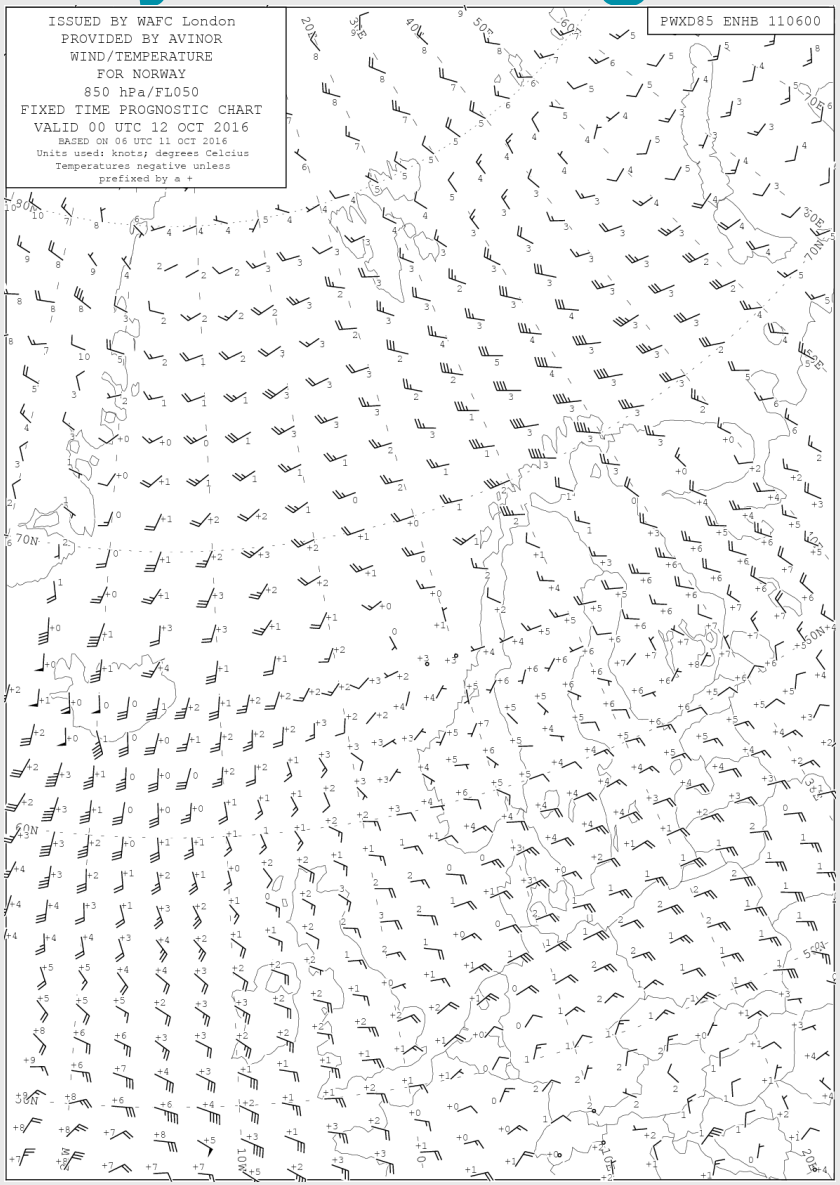
# Høydevind og -temperaturer




Fins for flere høyder
-FL050
-FL100
-FL180
-FL240
-FL300
-FL340
-FL390
-FL450

På NorthAviMet får man også info om FL020 og FL025



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# Symbolforklaring: Høydekart

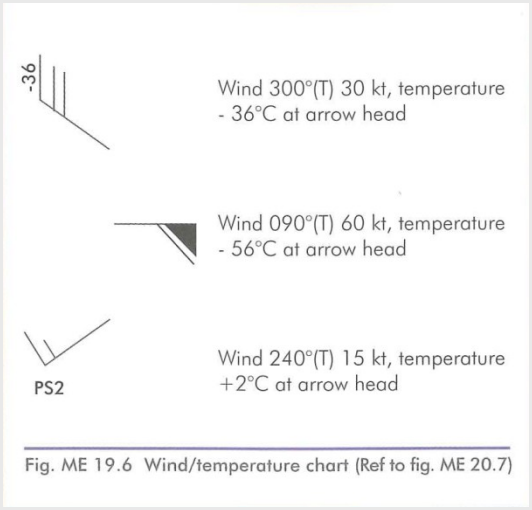

Fig. ME 19.6 Wind/temperature chart (Ref to fig. ME 20.7)



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# Høydevinder: Punktvarsel

Fins for
- Stavanger
- Ålesund / Vigra
- Trondheim/Værnes
- Rørvik / Ryum
- Bodø
- Bardufoss
- Banak / Lakselv

```
FBNO57 ENVN 110317
UPPER WIND TEMP PROG VALID 110600-111800UTC OCT16
OVER BODOE
            06Z           12Z           18Z
FL050...: 240/020KT PS02 260/015KT PS02 320/010KT PS01
FL100...: 240/020KT MS04 260/020KT MS04 260/025KT MS04
FL180...: 240/025KT MS20 260/020KT MS20 260/025KT MS20
FL240...: 220/035KT MS34 260/025KT MS34 270/020KT MS34
FL300...: 220/035KT MS47 260/025KT MS48 280/020KT MS48
FL340...: 210/035KT MS56 250/035KT MS57 270/020KT MS58
FL390...: 220/030KT MS62 240/040KT MS62 260/030KT MS62
TROPOP..: FL380, MS62 FL380, MS62 FL360, MS61
0-ISOTH.: FL070 FL070, NEG LYR 3000FT4000FT FL050
ICE.....: NIL NIL NIL
TURB....: NIL NIL NIL=
>>> END-OF-BULLETIN <<<
```



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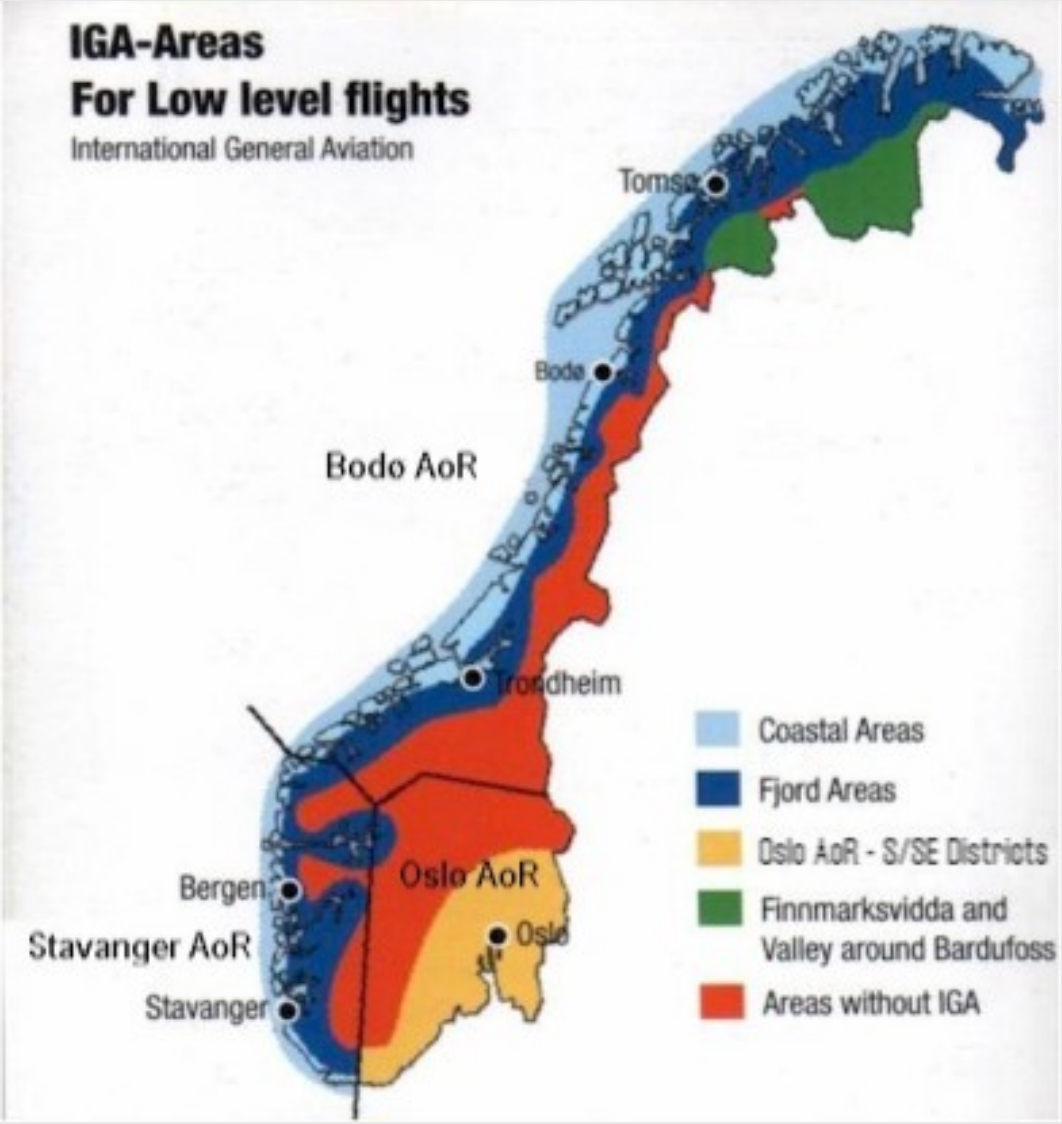
# IGA områder for Norge



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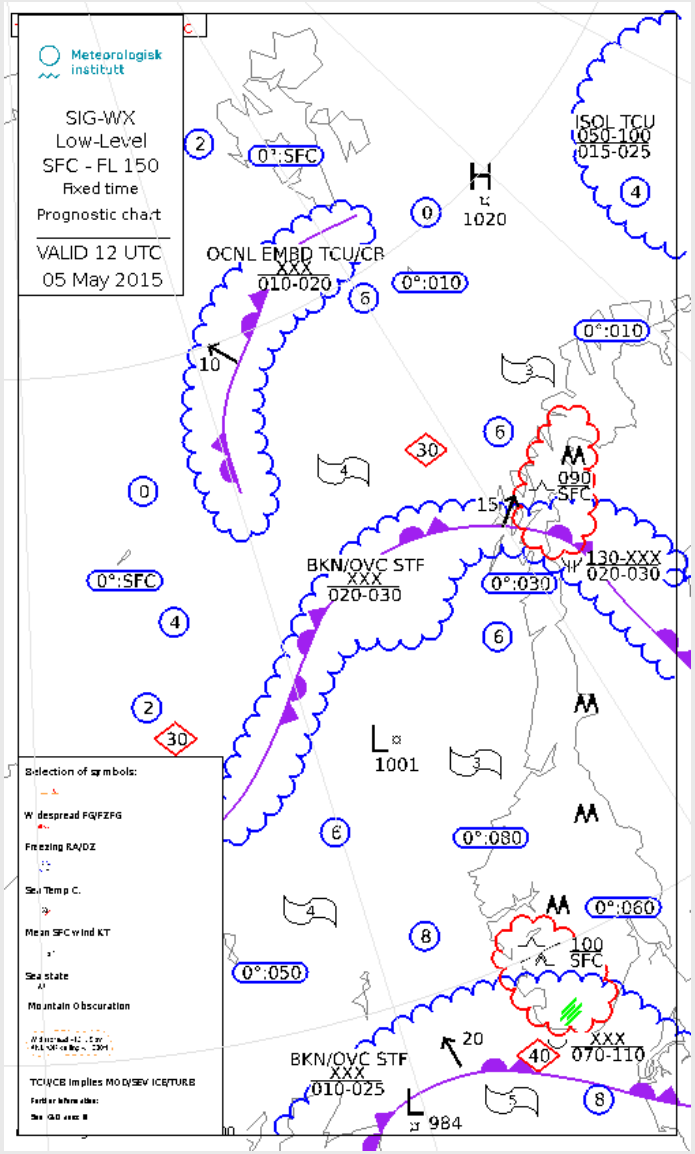
# IGA
# (International General Aviation)

FBNO45 ENMI 121257
IGA PROG VALID 121300-122300 UTC OCT 2016 NORWAY FIR N OF N6500
TROMS AND FINNMARK COASTAL AND FJORD DISTRICTS, VALLEYS
AROUND BARDUFOSS, FINNMARKSVIDDA
WIND SFC.....: SW-NW/05-15KT, OCNL 20-30KT COT
WIND 2000FT.....: W-NW/20-35KT
WIND/TEMP FL 050....: 270-320/20-40KT/MS02-00
WIND/TEMP FL 100....: 290-320/25-45KT/MS10-MS06
WX.....: SCT RA/SHRA, WXNIL S PART FINNMARK
VIS.....: +10KM, LCA 4-8KM IN WX COT
CLD.....: SCT/BKN 2000-5000FT, LCA BKN 0800-1500FT ASSW WX
0-ISOTHERM.....: 2000-4000FT
ICE.....: LCA FBL/MOD NW PART
TURB.....: LCA MOD
OUTLOOK FOR TOMORROW: ALMOST SAME AS ABOVE=

# Sig.Kart Norge



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# Symbolforklaring: Sig.Kart

## SHEET OF NOTATIONS USED IN FLIGHT DOCUMENTATION

### 1. Symbols for significant weather

| | | | |
|---|---|---|---|
| Tropical cyclone | | Drizzle | |
| Severe squall line* | | Rain | |
| Moderate turbulence | | Snow | |
| Severe turbulence | | Shower | Hail |
| Mountain waves | | Widespread blowing snow | |
| Moderate aircraft icing | | Severe sand or dust haze | |
| Severe aircraft icing | | Widespread sandstorm or dust storm | |
| Widespread fog | | Widespread haze | |
| Radioactive materials in the atmosphere** | | Widespread mist | |
| Volcanic eruption*** | | Widespread smoke | |
| Mountain obscuration | | Freezing precipitation **** | |

* In-flight documentation for flights operating up to FL100. This symbol refers to "squall line".

** The following information should be included at the side of the chart: radioactive materials symbol; latitude/longitude of accident site; date and time of accident; check NOTAM for further information.

*** The following information should be included at the side of the chart: volcanic eruption symbol; name and international number of volcano (if known); latitude/longitude; date and time of the first eruption (if known);
Check SIGMETs and NOTAM or ASHTAM for volcanic ash.

**** This symbol does not refer to icing due to precipitation coming into contact with an aircraft which is at a very low temperature.

NOTE: Height indications between which phenomena are expected, top above base as per chart legend.

### 2. Fronts and convergence zones and other symbols used

| | | | |
|---|---|---|---|
| Cold front at the surface | | Position, speed and level of max. wind | FL 270 |
| Warm front at the surface | | Convergence line | |
| Occluded front at the surface | | Freezing level | 0°:100 |
| Quasi-stationary front at the surface | | Intertropical convergence zone | |
| Tropopause High | H 460 | State of the sea | 10 |
| Tropopause Low | 270 L | Sea-surface temperature | 18 |
| Tropopause Level | 380 | Widespread strong surface wind * | 40 |

FL 320 220/400 FL 310

Wind arrows indicate the maximum wind in jet and the flight level at which it occurs. If the maximum wind speed is 240 km/h (120 kt) or more, the flight levels between which winds are greater than 160 km/h (80 kt) is placed below the maximum wind level. In the example, winds are greater than 160 km/h (80 kt) between FL 220 and FL 400.

The heavy line delineating the jet axis begins/ends at the points where a wind speed of 160 km/h (80 kt) is forecast.

* This symbol refers to widespread surface wind speeds exceeding 60 km/h (30 kt).

### 3. Abbreviations used to describe clouds

#### 3.1 Type

| | | |
|---|---|---|
| CI = Cirrus | AS = Altostratus | ST = Stratus |
| CC = Cirrocumulus | NS = Nimbostratus | CU = Cumulus |
| CS = Cirrostratus | SC = Stratocumulus | CB = Cumulonimbus |
| AC = Altocumulus | | |

#### 3.2 Amount

Clouds except CB

| | |
|---|---|
| FEW = few (1/8 to 2/8) | BKN = broken (5/8 to 7/8) |
| SCT = scattered (3/8 to 4/8) | OVC = overcast (8/8) |

CB only

ISOL = individual CBs (isolated)
OCNL = well-separated CBs (occasional)
FRQ = CBs with little or no separation (frequent)
EMBD = CBs embedded in layers of other clouds or concealed by haze (embedded)

#### 3.3 Heights

Heights are indicated on SWH and SWM charts in flight levels (FL), top over base. When XXX is used, tops or bases are outside the layer of the atmosphere to which the chart applies.

In SWL charts:
i) Heights are indicated as altitudes above mean sea level;
ii) The abbreviation SFC is used to indicate ground level.

### 4. Depicting of lines and systems on specific charts

#### 4.1 Models SWH and SWM — Significant weather charts (high and medium)

| | | |
|---|---|---|
| Scalloped line | = | demarcation of areas of significant weather |
| Heavy broken line | = | delineation of area of CAT |
| Heavy solid line interrupted by wind arrow and flight level | = | position of jet stream axis with indication of wind direction, speed in kt or km/h and height in flight levels. The vertical extent of the jet stream is indicated (in flight levels) e.g. FL 270 accompanied by 240/290 indicates that the jet extends from FL 240 to FL 290. |
| Figures on arrows | = | speed in kt or km/h of movements of frontal system |
| Flight levels inside small rectangles | = | height in flight levels of tropopause at spot locations, e.g. 340. Low and high points of the tropopause topography are indicated by the letters L or H, respectively, inside a pentagon with the height in flight levels. Display explicit FL for JET dephts and tropopause height even if outside forecast bounds |

#### 4.2 Model SWL — Significant weather chart (low level)

| | | |
|---|---|---|
| X | = | position of pressure centres given in hectopascals |
| L | = | centre of low pressure |
| H | = | centre of high pressure |
| Scalloped lines | = | demarcation of area of significant weather |
| Dashed lines | = | altitude of 0°C isotherm in feet (hectofeet) or metres<br>NOTE: 0°C level may also be indicated by 0°: 060, i.e. 0°C level is at an altitude of 6 000 ft |
| Figures on arrows | = | speed in kt or km/h of movement of frontal systems, depressions or anticyclones |

Figure inside the state of the sea symbol = total wave height in feet or metres
Figure inside the sea-surface temperature symbol = sea-surface temperature in °C
Figures inside the strong surface wind symbol = wind in kt or km/h

#### 4.3 Arrows, feathers and pennants

Arrows indicate direction. Number of pennants and/or feathers correspond to speed.
Example:

270°/115 kt (equivalent to 230 km/h)
Pennants correspond to 50 kt or 100 km/h
Feathers correspond to 10 kt or 20 km/h
Half-feathers correspond to 5 kt or 10 km/h

* A conversion factor of 1 to 2 is used.

Table ME 19.2 Meteorological charts - symbology



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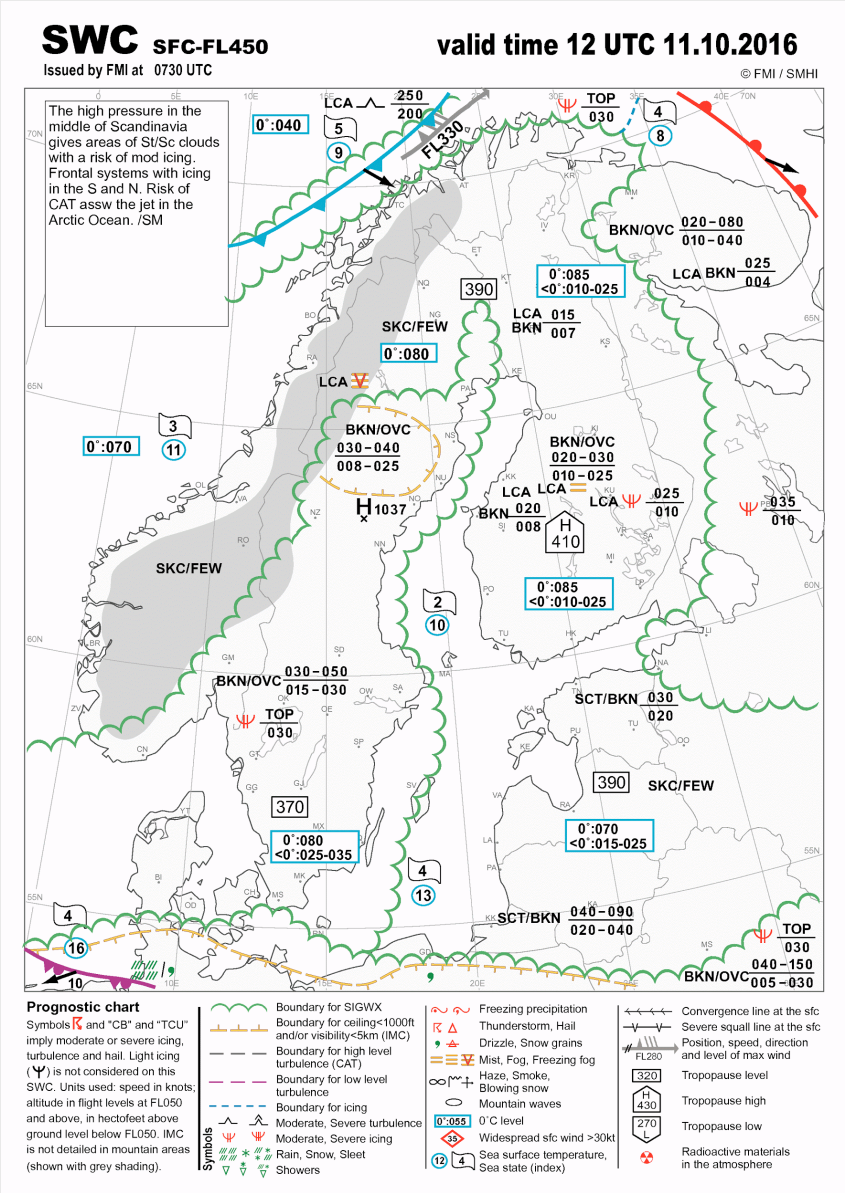
# Sig.Kart SMHI



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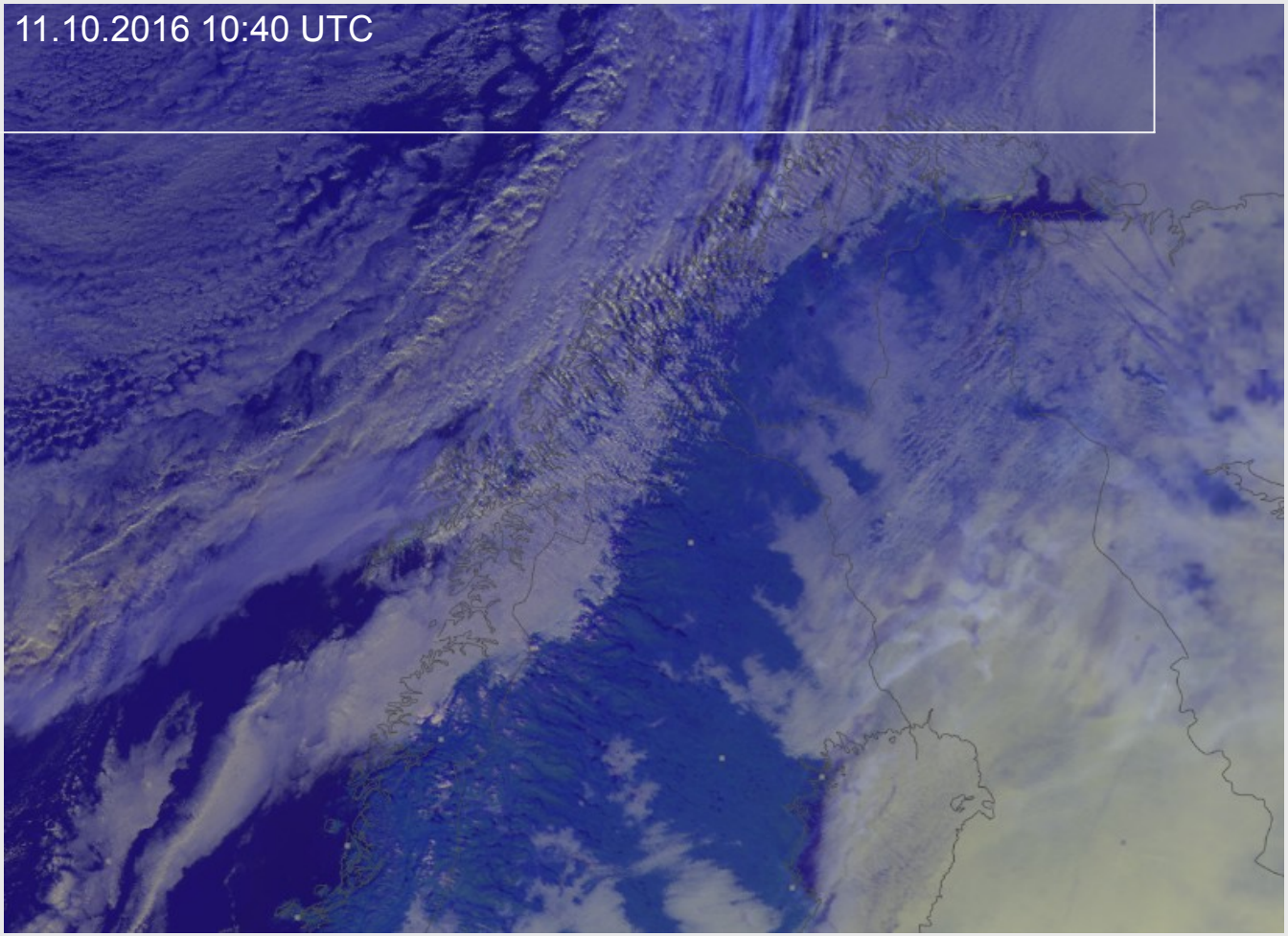
# Satellitt bilder



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# Sigmet - Fenomener I

- Tordenvær:
  - OBSC TS: obscured (skjult v/dis, røyk, mørke)
  - EMBD TS: embedded (skjult i skyer)
  - FRQ TS: frequent (hyppig, romlig dekning >75%)
  - SQL TS: squall line (tordenvær i bygelinjer)
  - OBSC TSGR: obscured with hail
  - EMBD TSGR: embedded with hail
  - FRQ TSGR: frequent with hail
  - SQL TSGR: squall line with hail
- Turbulens:
  - SEV TURB: severe turbulence (lavnivå, CAT, rotor, men ikke relatert til CB)
- Ising:
  - SEV ICE: severe icing (sterk ising, men ikke i CB)
  - SEV ICE (FZRA): severe icing due to freezing rain (sterk ising med underkjølt regn).

# Sigmet - Fenomener II

- Fjellbølger:
  - SEV MTW: severe mountain wave (vertikalhastighet 3,0 m/s eller mer, og/eller SEV TURB er varslet eller observert).
- Støvstorm:
  - HVY DS: heavy duststorm
- Sandstorm:
  - HVY SS: heavy sandstorm
- Tropisk syklon:
  - TC(+TC name): tropical cyclone(+TC name)
  - Brukes ikke i Norge!
- Radioactive cloud:
  - RDOACT CLD: radioactive cloud
- Vulkansk aske:
  - VA (+ volcano name, if known)

# SIGMET - format

- Navn på FIR i klartekst
- beskrivelse av fenomenet
- om fenomenet er observert (og forventet å vedvare) eller varslet
- lokalisering (avgrensing vha geografiske koordinater, evt. geografiske betegnelser som er kjent internasjonalt)
- høydeangivelse (FL)
- bevegelse/forventet bevegelse
- endring i intensitet (INTSF/WKN/NC)

# SIGMET - eksempler

WSNO35 ENMI 262336
ENBD SIGMET D01 VALID 270200/270600 ENVN-
ENOR NORWAY FIR OCNL SEV ICE FCST N OF N6500
AND W OF E02100 FL030/150 MOV NE 20KT INTSF=

WSNO34 ENMI 171146
ENBD SIGMET C02 VALID 171230/171630 ENVV-
ENOR NORWAY FIR OCNL SEV TURB FCST WI N6300
E00400 – N6430 E00530 – N6200 E0900 – N6200 E00500
– N6300 E00400 FL240/320 MOV ESE 5KT WKN

# SIGMET - eksemple VA

WVNO31 ENMI 130545
ENOS SIGMET A01 VALID 130600/131200 ENMI-
ENOR NORWAY FIR VA ERUPTION MT GRIMSVOTN
PSN N6425 W01720 VA CLD OBS AT
0600Z WI N6000 E00730 – N6200 E00730 – N6200
E00900 – N6000 E00900 – N6000 E00730
SFC/FL200 MOV N 20KT NC FCST 1200Z VA CLD APRX
N6100 E00730 – N6200 E00730 -
N6200 E00900 – N6100 E00900 – N6100 E00730 AND WI
N6000 E00730 – N6200 E00730 –
N6200 E00900 – N6000 E00900 – N6000 E00730
FL200/350 MOV N 40KT WKN FCST 1200Z
NO VA EXP

# AIRMET

Fenomen:

- moderat ising på fartøy i luften

Format / Gyldighet:

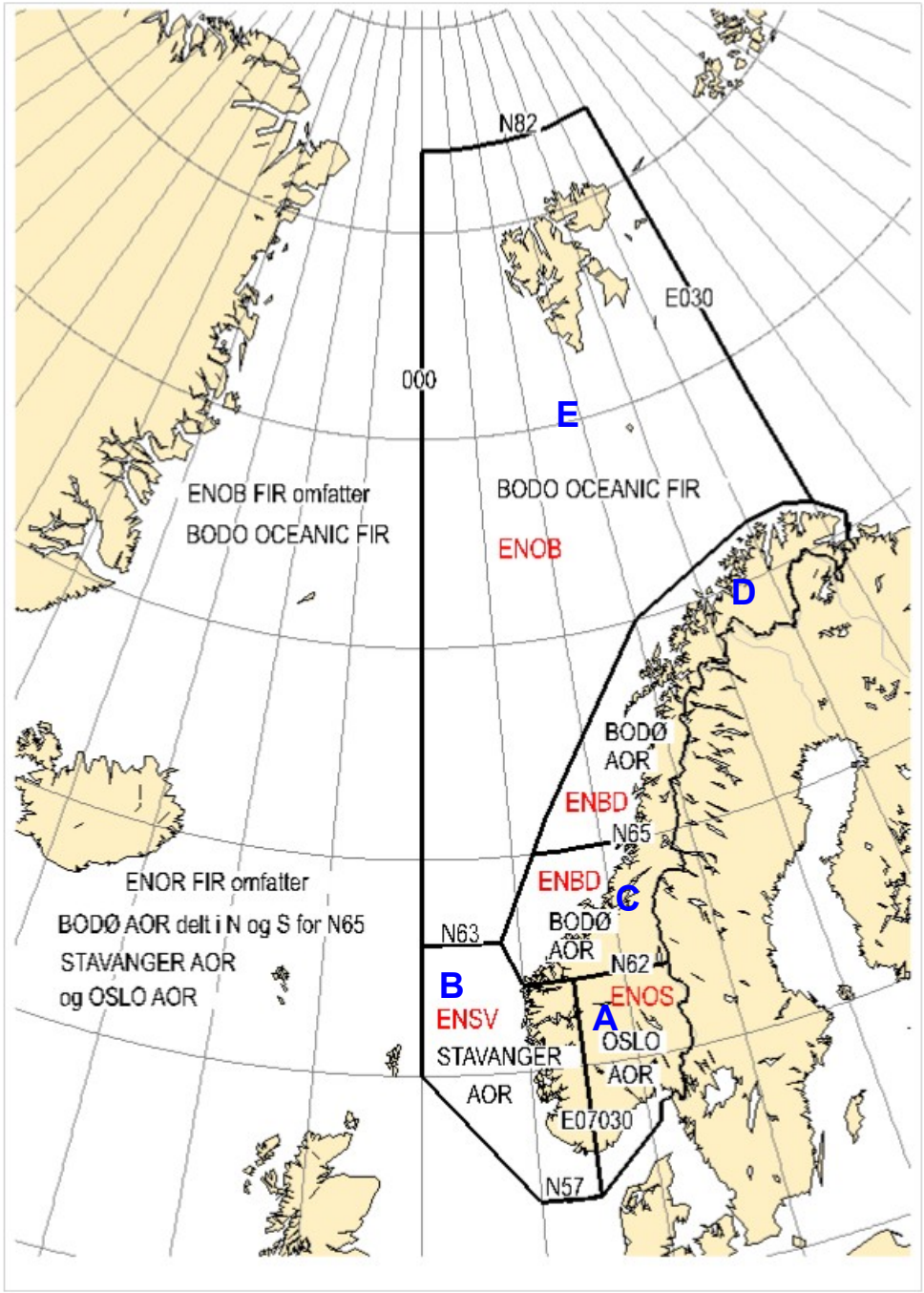
- samme format som SIGMET
- Gyldighetsperioden er maks 4 timer

Eksempel:
WANO35 ENMI 190930
ENBD AIRMET D01 VALID 191000/191400 ENVN -
ENOR NORWAY FIR OCNL MOD ICE FCST N OF N6500
AND S OF N6800 FL020/180
MOV E INTSF N PART=

# Oversikt over norske ansvars-områder (FIR)

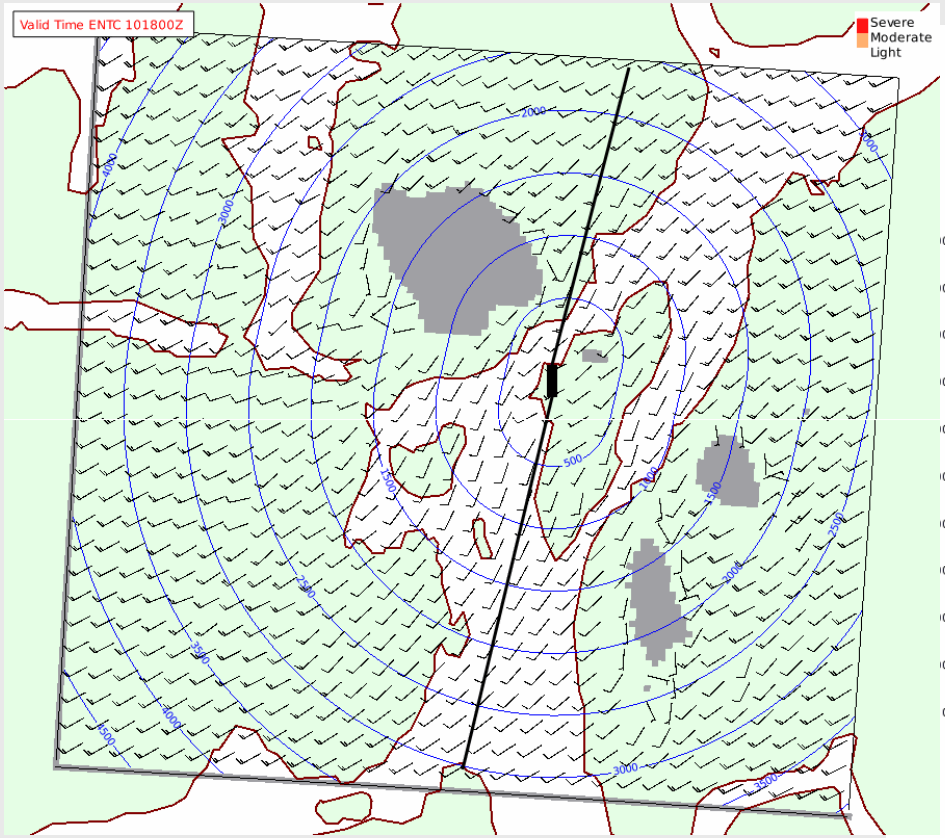
# Blir brukt i Airmet / Sigmet

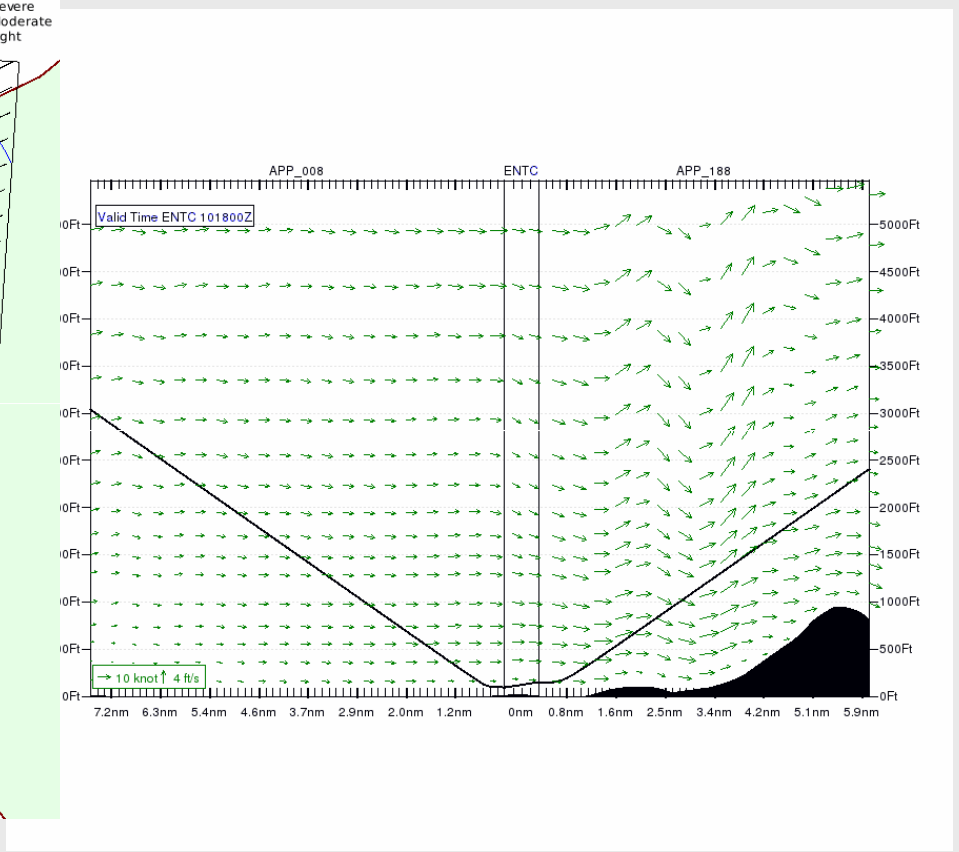
**Fig 1**. Norsk ansvarsområde: ENOB FIR og ENOR FIR.



# Turbulensvarsel

Langnes (ENTC)




Dette er pur modell-data!!!

Turb. Varsel fra meteorologen blir sent ut for enkelte flyplasser



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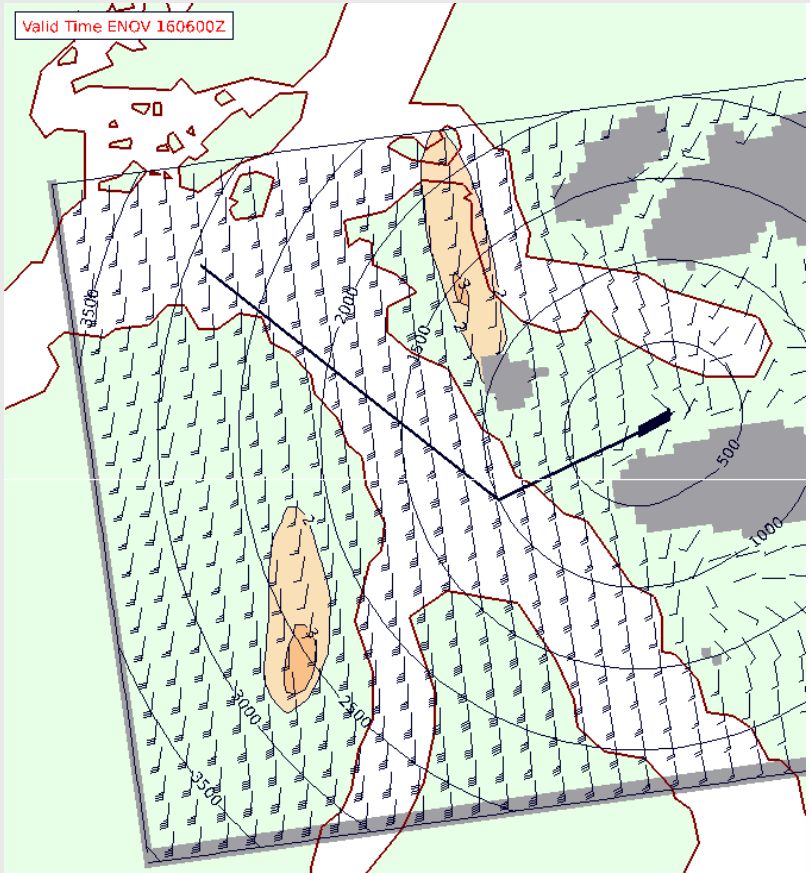
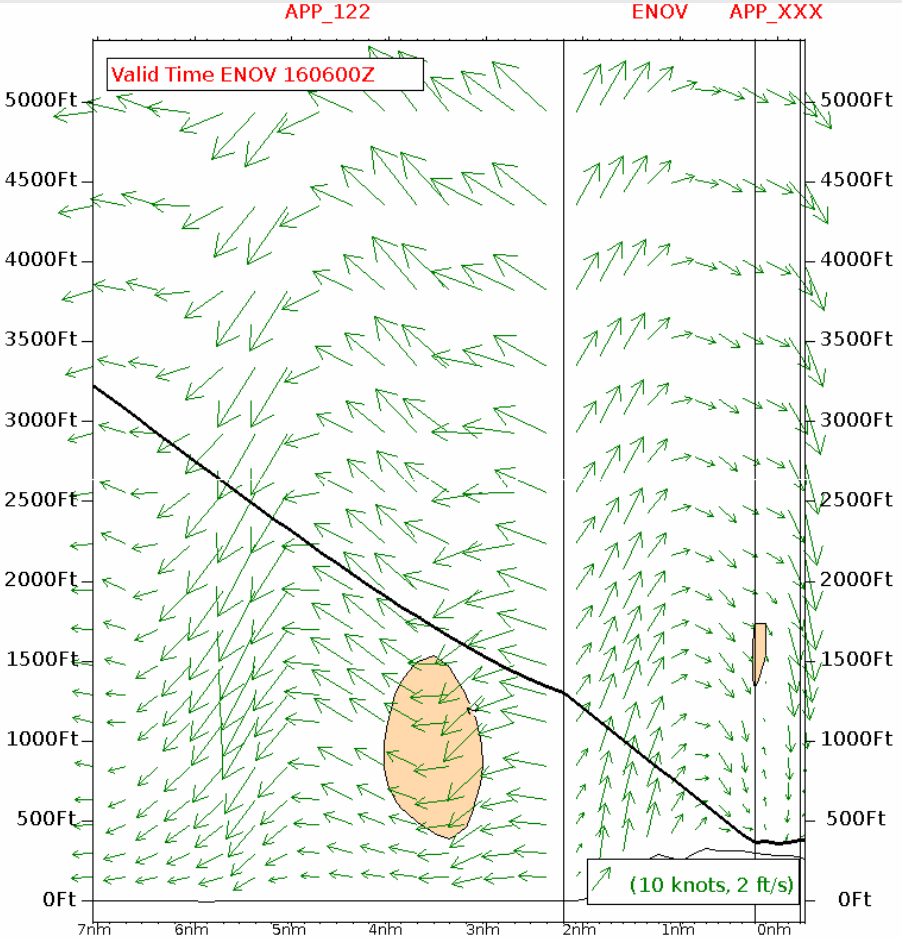
# Turbulensvarsel

Ørsta Volda / Hoven (ENOV)




Dette er pur modell-data!!!

Turb. Varsel fra meteorologen blir sent ut for enkelte flyplasser



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# Nyttige linker

- IPPC.no
- Northavimet.com
- yr.no
- Wetter3.com
- Wetterzentrale.de
- weathercharts.org
- kamerakartet.no

- http://weather.uwyo.edu/upperair/sounding.html
- https://www.northavimet.com/fileadmin/user_upload/Northavimet_User_Guide.pdf



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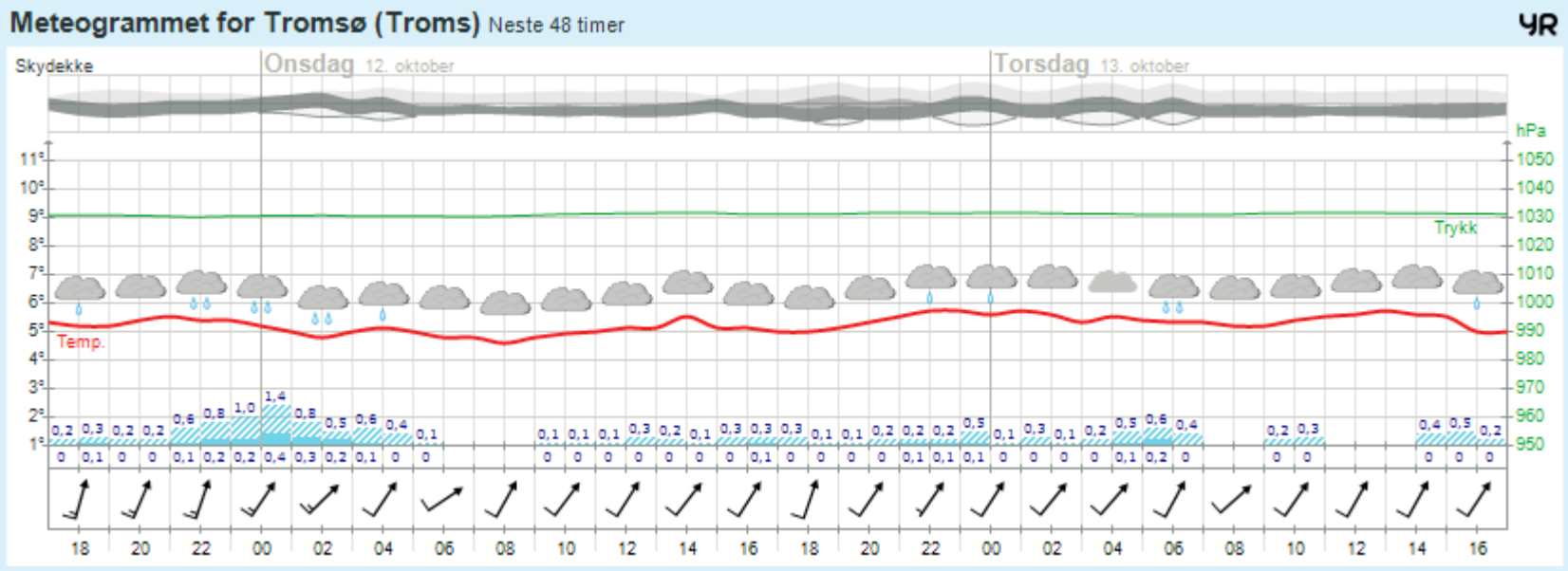
# Meteogrammer




kun modelldata!

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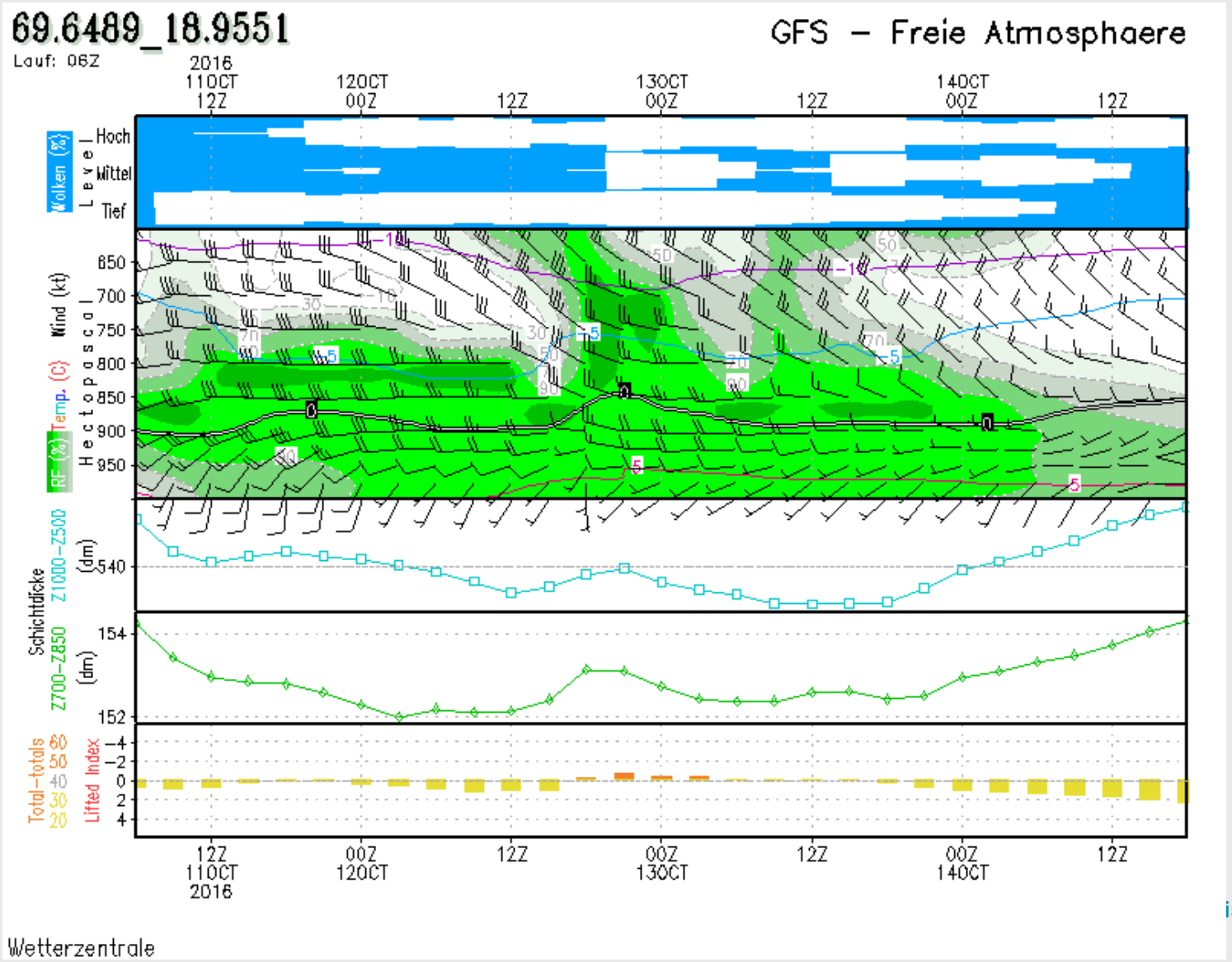
kun modelldata!

# Meteorgammer



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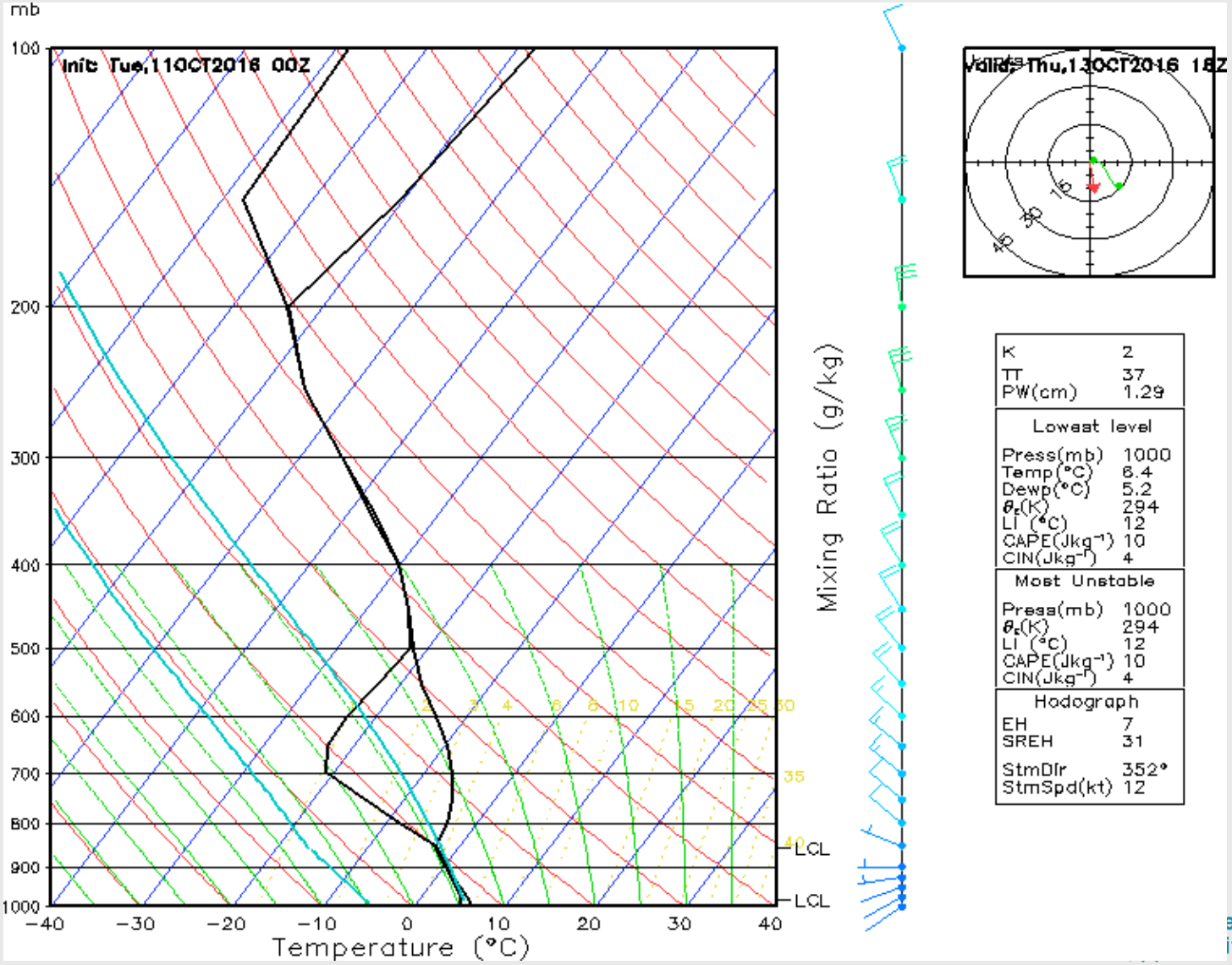
institutt

# Høydevinder Tromsø



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# Temakveld Tromsø Flyklubb: Vær og værvarsling

Sevim M.-Gulbrandsen (statsmeteorolog)

# Innhold

- Analyse-kart
- Diverse prognoser
  - IGA
  - Sigkart
  - Høydevinder
  - Turbulensvarsel
  - Sigmet
  - Airmet
- Nyttige linker



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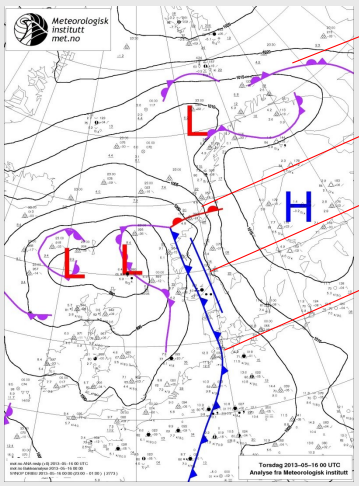
- De fleste kart utstilles 4 ganger om dagen:
  - 00z
  - 06z
  - 12z
  - 18z

- Det er både automatiserte kart (f.eks. høydevind) og manuell lagete kart (f.eks. analyser og sig.kart)

# Analyse Meteorologisk institutt

H: Høytrykk
L: Lavtrykk




Okklusion

Warmfront

Tråg

Kaldfront



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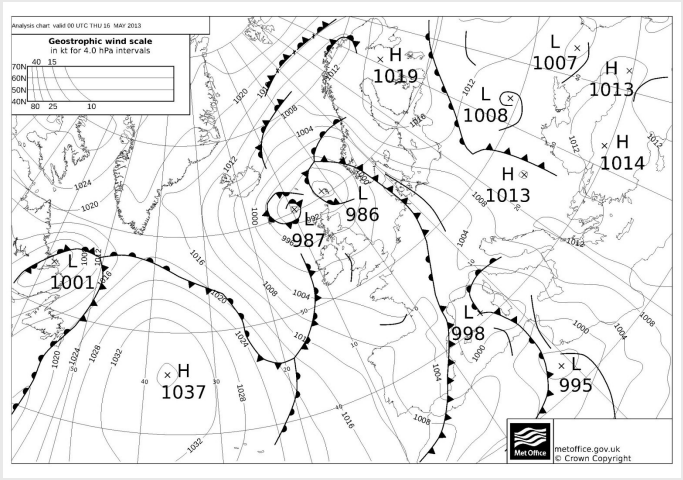
Bruk:
Få oversikt over værsituasjon

Kilder:
http://www.yr.no/verkart/analysekart.html
IPPC: Briefings -> Weather Chart -> Surface Analysis -> Norway
...

# Analyse UK Met Office



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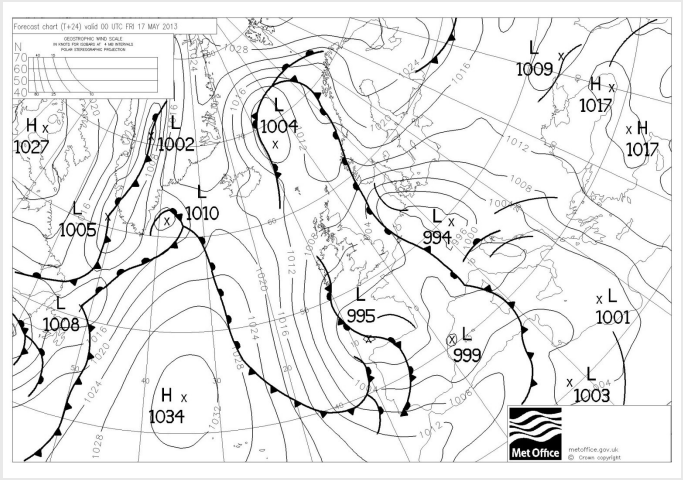
Bruk:
Planlegging noe dager fram i tid

Kilder:
weathercharts.org
northavimet -> Chart products -> Analysis / forecasts
wetter3.de

# 24 h Prognose UK MetOffice



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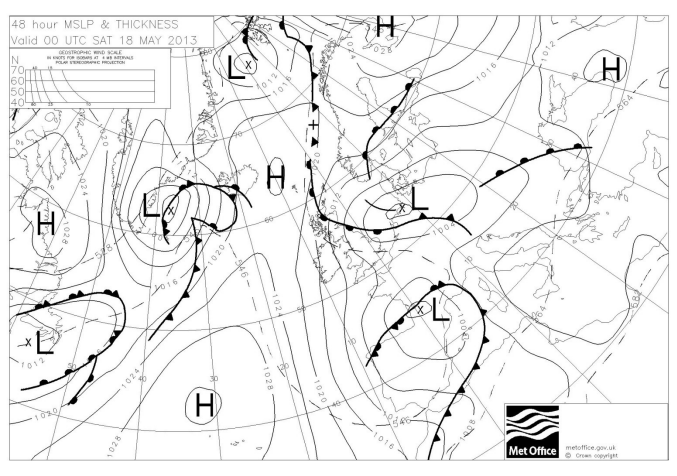
Bruk:
Planlegging noe dager fram i tid

Kilder:
weathercharts.org
northavimet -> Chart products -> Analysis / forecasts
wetter3.de -> Faxkarten

# 48 h Prognose UK MetOffice



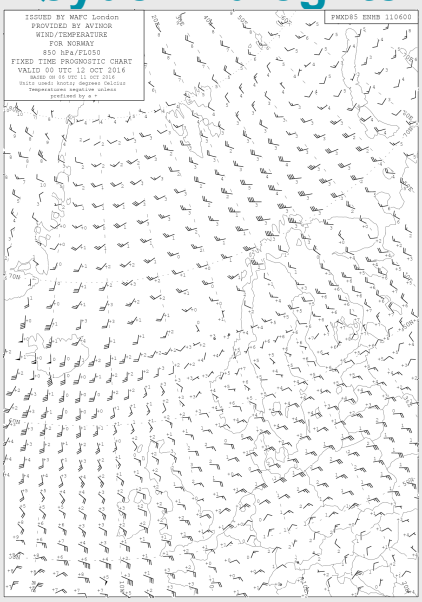



Meteorologisk institutt

Bruk:
Planlegging noe dager fram i tid

Kilder:
weathercharts.org
northavimet -> Chart products -> Analysis / forecasts
http://www1.wetter3.de/fax.html

# Høydevind og -temperaturer




Fins for flere høyder
-FL050
-FL100
-FL180
-FL240
-FL300
-FL340
-FL390
-FL450

På NorthAviMet får man også info om FL020 og FL025

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8

Bruk:
Finne høydevinder for planlegging av navigasjonsturer

Kilder:
https://www.ippc.no/ippc/chartlist_new.jsp
https://www.northavimet.com/model-data/weather-maps/

# Symbolforklaring: Høydekart

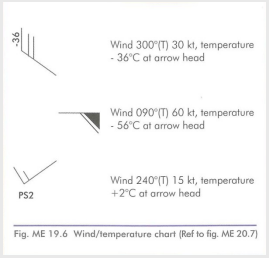

Fig. ME 19.6 Wind/temperature chart (Ref to fig. ME 20.7)



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Pilretning gir vindretning
Antal “fjær” gir vindstyrke: kort strek = 05kn, lang strek = 10 kn, fylt trekant = 50kt
Temperatur: “PS” positive sign >0, “-” eller ingenting: negative sign <0

# Høydevinder: Punktvarsel

Fins for
- Stavanger
- Ålesund / Vigra
- Trondheim/Værnes
- Rørvik / Ryum
- Bodø
- Bardufoss
- Banak / Lakselv

```
FBNO57 ENVN 110317
UPPER WIND TEMP PROG VALID 110600-111800UTC OCT16
OVER BODOE
              06Z           12Z           18Z
FL050...: 240/020KT PS02 260/015KT PS02 320/010KT PS01
FL100...: 240/020KT MS04 260/020KT MS04 260/025KT MS04
FL180...: 240/025KT MS20 260/020KT MS20 260/025KT MS20
FL240...: 220/035KT MS34 260/025KT MS34 270/020KT MS34
FL300...: 220/035KT MS47 260/025KT MS48 280/020KT MS48
FL340...: 210/035KT MS56 250/035KT MS57 270/020KT MS58
FL390...: 220/030KT MS62 240/040KT MS62 260/030KT MS62
TROPOP..: FL380, MS62 FL380, MS62 FL360, MS61
0-ISOTH.: FL070 FL070, NEG LYR 3000FT4000FT FL050
ICE.....: NIL NIL NIL
TURB....: NIL NIL NIL=
>>> END-OF-BULLETIN <<<
```



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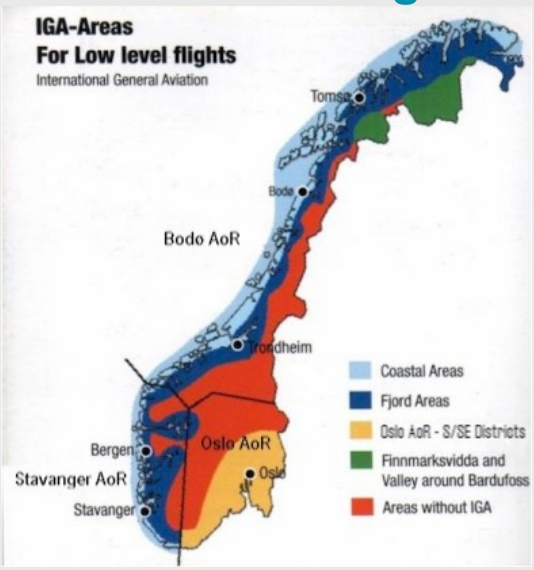
Kilder:
https://www.ippc.no/ippc/aisiga.jsp?
bulletinId=FBNO56,NO55,NO57,NO62,NO58&tbl=upperwind

# IGA områder for Norge



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# IGA
# (International General Aviation)

FBNO45 ENMI 121257
IGA PROG VALID 121300-122300 UTC OCT 2016 NORWAY FIR N OF N6500
TROMS AND FINNMARK COASTAL AND FJORD DISTRICTS, VALLEYS
AROUND BARDUFOSS, FINNMARKSVIDDA
WIND SFC.....: SW-NW/05-15KT, OCNL 20-30KT COT
WIND 2000FT.....: W-NW/20-35KT
WIND/TEMP FL 050....: 270-320/20-40KT/MS02-00
WIND/TEMP FL 100....: 290-320/25-45KT/MS10-MS06
WX.....: SCT RA/SHRA, WXNIL S PART FINNMARK
VIS.....: +10KM, LCA 4-8KM IN WX COT
CLD.....: SCT/BKN 2000-5000FT, LCA BKN 0800-1500FT ASSW WX
0-ISOTHERM.....: 2000-4000FT
ICE.....: LCA FBL/MOD NW PART
TURB.....: LCA MOD
OUTLOOK FOR TOMORROW: ALMOST SAME AS ABOVE=

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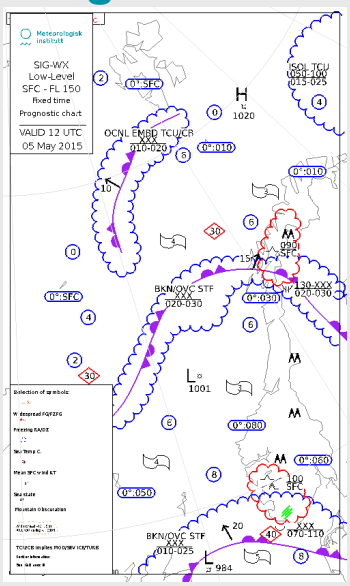
Områdevarsel. Gir grove trekk.
Sjekk om området du skal fly i er dekket!

Kilder:
IPPC -> Briefings -> IGA prognosis
https://www.northavimet.com/low-level-forecast/norway/

# Sig.Kart Norge

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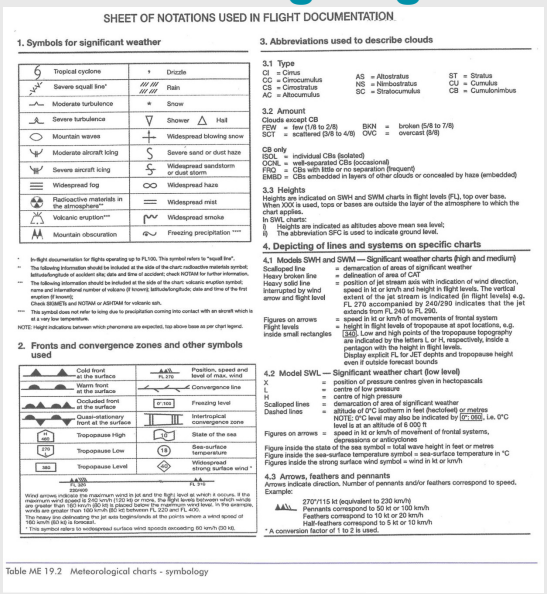
For tegnforklaring se neste slide og egen pdf.

Kilder:

https://www.northavimet.com/NamConWS/rest/map/data/sigkart/
IPPC -> Weather Charts -> Significant Weather Chart -> Norway -> FL not relevant

# Symbolforklaring: Sig.Kart



SHEET OF NOTATIONS USED IN FLIGHT DOCUMENTATION

**1. Symbols for significant weather**

| | | | |
|---|---|---|---|
| Tropical cyclone | | Drizzle | |
| Severe squall line* | | Rain | |
| Moderate turbulence | | Snow | |
| Severe turbulence | | Shower | Hail |
| Mountain waves | | Widespread blowing snow | |
| Moderate aircraft icing | | Severe sand or dust haze | |
| Severe aircraft icing | | Widespread sandstorm or dust storm | |
| Widespread fog | | Widespread haze | |
| Radioactive materials in the atmosphere** | | Widespread mist | |
| Volcanic eruption*** | | Widespread smoke | |
| Mountain obscuration | | Freezing precipitation **** | |

* In-flight documentation for flights operating up to FL100. This symbol refers to "squall line".

** The following information should be included at the side of the chart: radioactive materials symbol; latitude/longitude of accident site; date and time of accident; check NOTAM for further information.

*** The following information should be included at the side of the chart: volcanic eruption symbol; name and international number of volcano (if known); latitude/longitude; date and time of the first eruption (if known);
Check BGSNETs and NOTAM or ASHTAM for volcanic ash.

**** This symbol does not refer to icing due to precipitation coming into contact with an aircraft which is at a very low temperature.

NOTE: Height indications between which phenomena are expected, top above base as per chart legend.

**2. Fronts and convergence zones and other symbols used**

| | | | |
|---|---|---|---|
| Cold front at the surface | | Position, speed and level of max. wind | FL 270 |
| Warm front at the surface | | Convergence line | |
| Occluded front at the surface | | Freezing level | 6° 100 |
| Quasi-stationary front at the surface | | Intertropical convergence zone | |
| Tropopause High | 360 | State of the sea | |
| Tropopause Low | 270 | Sea-surface temperature | 18 |
| Tropopause Level | 360 | Widespread strong surface wind * | |

FL 320 / 230 KT — FL 370

Wind arrows indicate the maximum wind in jet and the flight level at which it occurs. If the maximum wind speed is 240 km/h (130 kt) or more, the flight levels between which winds are greater than 180 km/h (80 kt) is placed below the maximum wind level. In the example, winds are greater than 180 km/h (80 kt) between FL 320 and FL 400.

The heavy line delineating the jet axis begins/ends at the points where a wind speed of 180 km/h (80 kt) is reached.

* This symbol refers to widespread surface wind speeds exceeding 60 km/h (30 kt).

**3. Abbreviations used to describe clouds**

**3.1 Type**

| | | |
|---|---|---|
| CI = Cirrus | AS = Altostratus | ST = Stratus |
| CC = Cirrocumulus | NS = Nimbostratus | CU = Cumulus |
| CS = Cirrostratus | SC = Stratocumulus | CB = Cumulonimbus |
| AC = Altocumulus | | |

**3.2 Amount**

Clouds except CB

| | | | |
|---|---|---|---|
| FEW = few (1/8 to 2/8) | BKN = | broken (5/8 to 7/8) |
| SCT = scattered (3/8 to 4/8) | OVC = | overcast (8/8) |

CB only

ISOL = individual CBs (isolated)
OCNL = well-separated CBs (occasional)
FRQ = CBs with little or no separation (frequent)
EMBD = CBs embedded in layers of other clouds or concealed by haze (embedded)

**3.3 Heights**

Heights are indicated on SWH and SWM charts in flight levels (FL), top over base.
When XXX is used, tops or bases are outside the layer of the atmosphere to which the chart applies.
In SWL charts:
i) Heights are indicated as altitudes above mean sea level;
ii) The abbreviation SFC is used to indicate ground level.

**4. Depicting of lines and systems on specific charts**

**4.1 Models SWH and SWM — Significant weather charts (high and medium)**

| | | |
|---|---|---|
| Scalloped line | = | demarcation of areas of significant weather |
| Heavy broken line | = | delineation of area of CAT |
| Heavy solid line | = | position of jet stream axis with indication of wind direction, speed in kt or km/h and height in flight levels. The vertical extent of the jet stream is indicated (in flight levels) e.g. FL 270 accompanied by 240/290 indicates that the jet extends from FL 240 to FL 290. |
| Interrupted by wind arrow and flight level | | |
| Figures on arrows | = | speed in kt or km/h of movements of frontal system |
| Flight levels inside small rectangles | = | height in flight levels of tropopause at spot locations, e.g. 360. Low and high points of the tropopause topography are indicated by the letters L or H, respectively, inside a pentagon with the height in flight levels.<br>Display explicit FL for JET depths and tropopause height even if outside forecast bounds |

**4.2 Model SWL — Significant weather chart (low level)**

| | | |
|---|---|---|
| X | = | position of pressure centres given in hectopascals |
| L | = | centre of low pressure |
| H | = | centre of high pressure |
| Scalloped lines | = | demarcation of area of significant weather |
| Dashed lines | = | altitude of 0°C isotherm in feet (hectofeet) or metres<br>NOTE: 0°C level may also be indicated by 0° 060, i.e. 0°C level is at an altitude of 6 000 ft |
| Figures on arrows | = | speed in kt or km/h of movement of frontal systems, depressions or anticyclones |

Figure inside the state of the sea symbol = total wave height in feet or metres
Figure inside the sea-surface temperature symbol = sea-surface temperature in °C
Figures inside the strong surface wind symbol = wind in kt or km/h

**4.3 Arrows, feathers and pennants**

Arrows indicate direction. Number of pennants and/or feathers correspond to speed.
Example:

270°/115 kt (equivalent to 230 km/h)
Pennants correspond to 50 kt or 100 km/h
Feathers correspond to 10 kt or 20 km/h
Half-feathers correspond to 5 kt or 10 km/h

* A conversion factor of 1 to 2 is used.

Table ME 19.2 Meteorological charts - symbology



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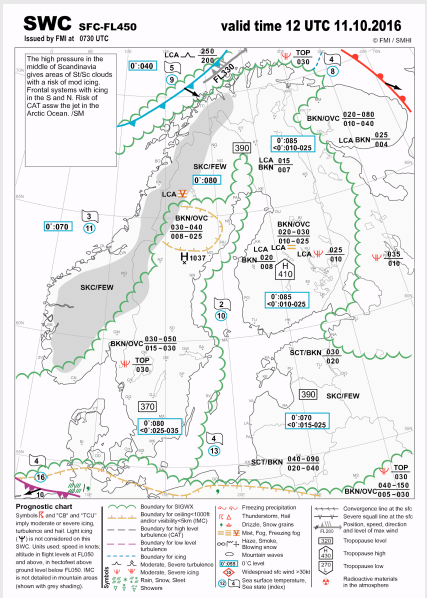
# Sig.Kart SMHI

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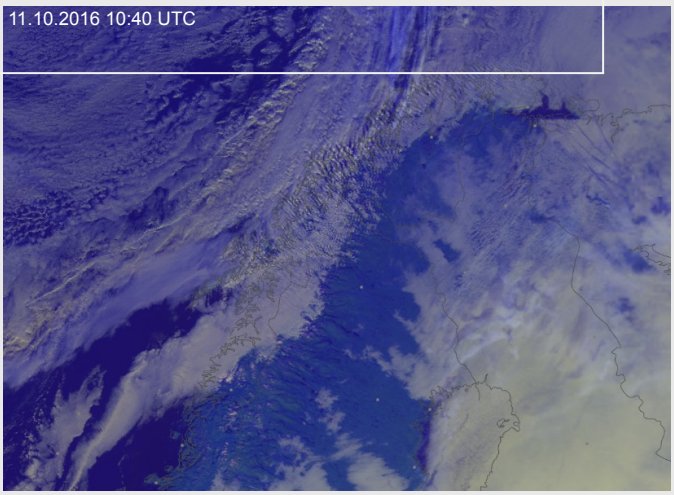
Kilder:
IPPC -> Briefing -> Swedish SIG WX chart
https://www.aro.lfv.se/Links/Link/ViewLink?TorLinkId=229&type=MET

# Satellitt bilder



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Anbefaler polarbane satellitter, siden geostasjonære satellitter dekker nord for N65 svært dårlig.

Kilder:
http://www.yr.no/satellitt/polarbane.html
https://www.northavimet.com/satellite/

## Sigmet - Fenomener I

- Tordenvær:
  - OBSC TS: obscured (skjult v/dis, røyk, mørke)
  - EMBD TS: embedded (skjult i skyer)
  - FRQ TS: frequent (hyppig, romlig dekning >75%)
  - SQL TS: squall line (tordenvær i bygelinjer)
  - OBSC TSGR: obscured with hail
  - EMBD TSGR: embedded with hail
  - FRQ TSGR: frequent with hail
  - SQL TSGR: squall line with hail
- Turbulens:
  - SEV TURB: severe turbulence (lavnivå, CAT, rotor, men ikke relatert til CB)
- Ising:
  - SEV ICE: severe icing (sterk ising, men ikke i CB)
  - SEV ICE (FZRA): severe icing due to freezing rain (sterk ising med underkjølt regn).

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Gyldighetsperioden for en SIGMET skal ikke være mer enn 4 timer.
For en WV-SIGMET om vulkansk askesky kan varighet være opptil 6 timer.

SIGMET skal ikke utstedes mer enn 4 timer før det forventes at de aktuelle forholdene vil opptre.

Forklaringer:
Begrepene som nyttes ved informasjon om tordenvær i SIGMET har følgende mening:
OBSC- Obscured (skjult) indikerer at tordenværet er skjult av dis eller røyk eller ikke kan sees på
grunn av mørke.
EMBD- Embedded (innhyllet/innbakt i) indikerer at tordenværet er innhyllet i skylag og ikke så lett
kan oppdages.
FRQ- Frequent (hyppig,"tett") indikerer et område med tordenaktivitet der det er liten eller ingen
avstand mellom tilgrensende tordenvær, med romlig dekning på over 75% av området som berøres eller er varslet å bli berørt av fenomenet.
SQL- Squall line indikerer tordenvær langs en linje med lite eller ingen avstand mellom de enkelte
skyene.

# Sigmet - Fenomener II

- Fjellbølger:
  - SEV MTW: severe mountain wave (vertikalhastighet 3,0 m/s eller mer, og/eller SEV TURB er varslet eller observert).
- Støvstorm:
  - HVY DS: heavy duststorm
- Sandstorm:
  - HVY SS: heavy sandstorm
- Tropisk syklon:
  - TC(+TC name): tropical cyclone(+TC name)
  - Brukes ikke i Norge!
- Radioactive cloud:
  - RDOACT CLD: radioactive cloud
- Vulkansk aske:
  - VA (+ volcano name, if known)

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Gyldighetsperioden for en SIGMET skal ikke være mer enn 4 timer.
For en WV-SIGMET om vulkansk askesky kan varighet være opptil 6 timer.

Forklaring:
RDOACT CLD:
I samarbeid med Statens Strålevern

# SIGMET - format

- Navn på FIR i klartekst
- beskrivelse av fenomenet
- om fenomenet er observert (og forventet å vedvare) eller varslet
- lokalisering (avgrensing vha geografiske koordinater, evt. geografiske betegnelser som er kjent internasjonalt)
- høydeangivelse (FL)
- bevegelse/forventet bevegelse
- endring i intensitet (INTSF/WKN/NC)



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Kilder:
IPPC (både SIGMET og AIRMET)
NorthAviMet (bare SIGMET, ikke airmet) - grafisk
skyvektor.com (bare SIGMET, ikke airmet) - grafisk

# SIGMET - eksempler

WSNO35 ENMI 262336
ENBD SIGMET D01 VALID 270200/270600 ENVN-
ENOR NORWAY FIR OCNL SEV ICE FCST N OF N6500
AND W OF E02100 FL030/150 MOV NE 20KT INTSF=

WSNO34 ENMI 171146
ENBD SIGMET C02 VALID 171230/171630 ENVV-
ENOR NORWAY FIR OCNL SEV TURB FCST WI N6300
E00400 – N6430 E00530 – N6200 E0900 – N6200 E00500
– N6300 E00400 FL240/320 MOV ESE 5KT WKN

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Det finnes forskjellige måter å angi geografisk utstrekning:
Helst med polygon, men “N/S/E/W of [lengde/breddegrader] / [line Nnnnn Wnnnnn – Nnnnn Wnnnnn] er også lov

# SIGMET - eksemple VA

WVNO31 ENMI 130545
ENOS SIGMET A01 VALID 130600/131200 ENMI-
ENOR NORWAY FIR VA ERUPTION MT GRIMSVOTN
PSN N6425 W01720 VA CLD OBS AT
0600Z WI N6000 E00730 – N6200 E00730 – N6200
E00900 – N6000 E00900 – N6000 E00730
SFC/FL200 MOV N 20KT NC FCST 1200Z VA CLD APRX
N6100 E00730 – N6200 E00730 -
N6200 E00900 – N6100 E00900 – N6100 E00730 AND WI
N6000 E00730 – N6200 E00730 –
N6200 E00900 – N6000 E00900 – N6000 E00730
FL200/350 MOV N 40KT WKN FCST 1200Z
NO VA EXP



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# AIRMET

Fenomen:
- moderat ising på fartøy i luften

Format / Gyldighet:
- samme format som SIGMET
- Gyldighetsperioden er maks 4 timer

Eksempel:
WANO35 ENMI 190930
ENBD AIRMET D01 VALID 191000/191400 ENVN -
ENOR NORWAY FIR OCNL MOD ICE FCST N OF N6500
AND S OF N6800 FL020/180
MOV E INTSF N PART=

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Nasjonal avtale med luftfarttilsynet. Andre skandinaviske land har det sannsynligvis ikke.

Kilder:
IPPC

# Oversikt over norske ansvars-områder (FIR)

## Blir brukt i Airmet / Sigmet

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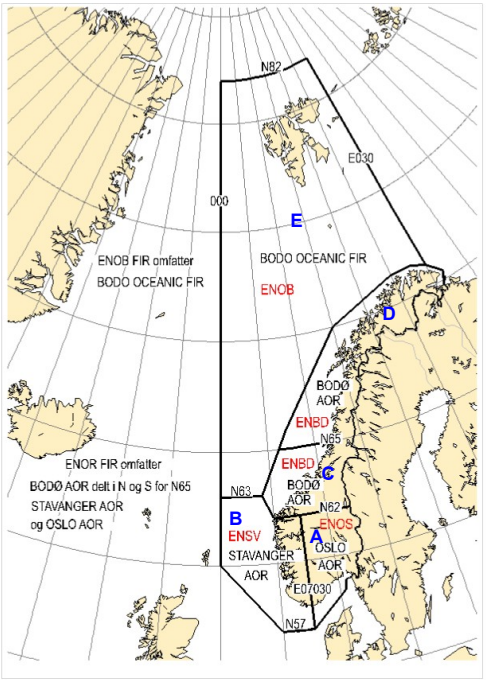
**Fig 1**. Norsk ansvarsområde: ENOB FIR og ENOR FIR.



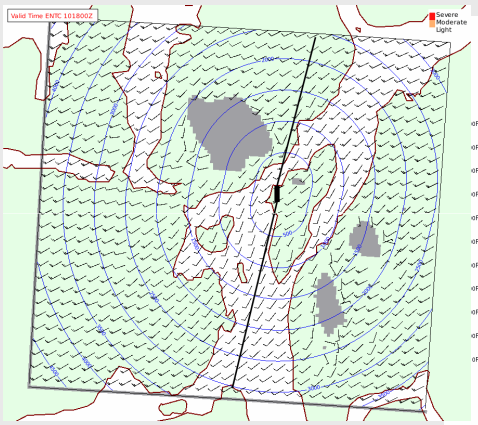

Når sigmet / airmet er ute, hører man på ATIS "... Alpha03 / Bravo04 valid … ".

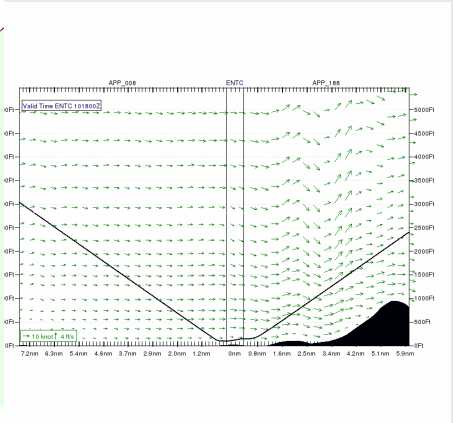
Nord for ENBN over land: Delta
Havområder N of 63N inkl Svalbard: Echo

Tallet er løpenummer.

# Turbulensvarsel

Langnes (ENTC)




Dette er pur modell-data!!!
Turb. Varsel fra meteorologen blir sent ut for enkelte flyplasser



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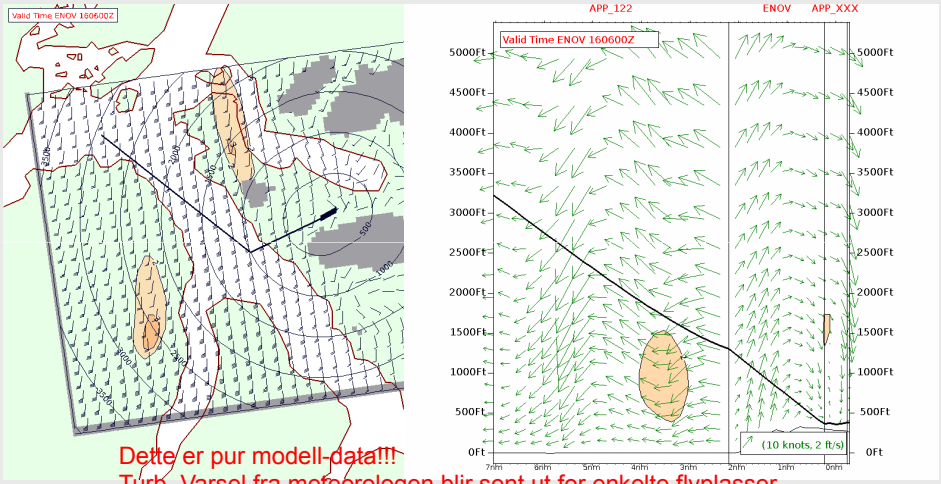
Kilder:
https://www.ippc.no/ippc/turbulencemaps.jsp
Meteorologens TURB varsel kommer opp på IPPC

# Turbulensvarsel

Ørsta Volda / Hoven (ENOV)




Dette er pur modell-data!!!

Turb. Varsel fra meteorologen blir sent ut for enkelte flyplasser



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Kilder:

https://www.ippc.no/ippc/turbulencemaps.jsp

# Nyttige linker

- IPPC.no
- Northavimet.com
- yr.no
- Wetter3.com
- Wetterzentrale.de
- weathercharts.org
- kamerakartet.no

- http://weather.uwyo.edu/upperair/sounding.html
- https://www.northavimet.com/fileadmin/user_upload/Northavimet_User_Guide.pdf



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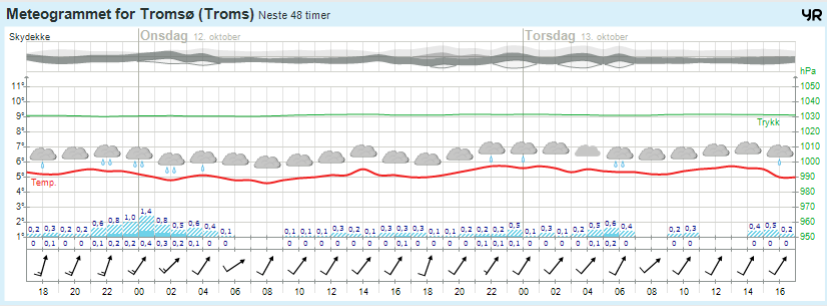
# Meteogrammer




kun modelldata!

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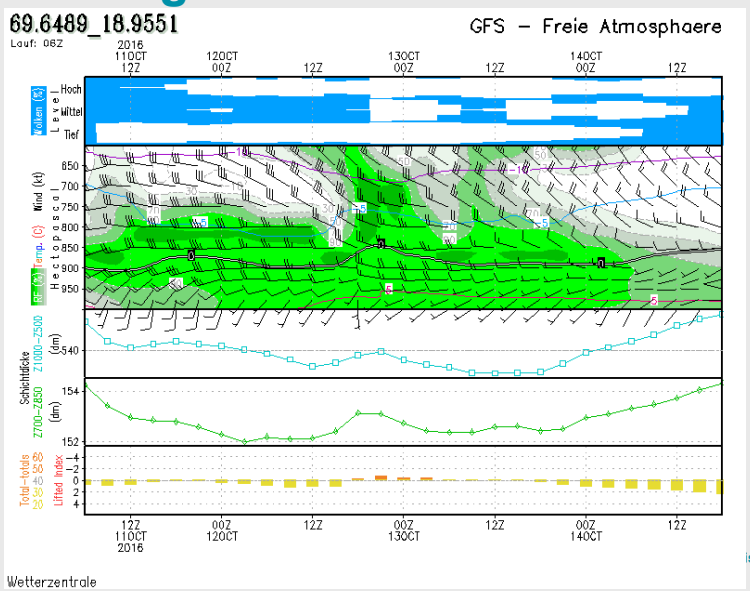
http://www.yr.no/sted/Norge/Troms/Troms%C3%B8/Troms%C3%B8/time_for_time_detalje

yr -> velg sted -> time for time -> detaljert

kun modelldata!

# Meteorgammer

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http://www.wetterzentrale.de/en/show_diagrams.aspx?
model=gfs&lid=OP&var=212&bw=False&lat=69.6489&lon=18.9551&zip=

Andere Meteorgrammkilder:
https://www.northavimet.com/model-data/meteogram/
http://www.wetterzentrale.de/de/show_diagrams.aspx?lat=69.6489&lon=18.9551&model=

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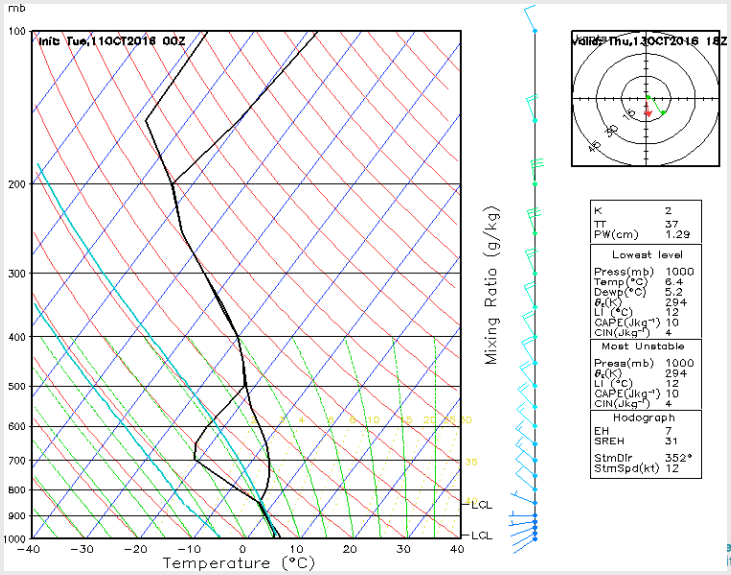
# Høydevinder Tromsø

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Prognostiske oppstigninger = varsler, ingen reell balongslipp.

http://www.wetterzentrale.de/de/show_soundings.aspx