

User Guide

Turbulence Predictions at Norwegian Airports

DESCRIPTION OF THE TURBULENCE CALCULATION SYSTEM:

The turbulence calculations (AERODROME TURBULENCE - "ADTURB") are carried out by statistical calculations using machine learning. The forecasts are updated every 3rd hours (00, 03 ... 21 UTC) with a forecast length of 18 hours.

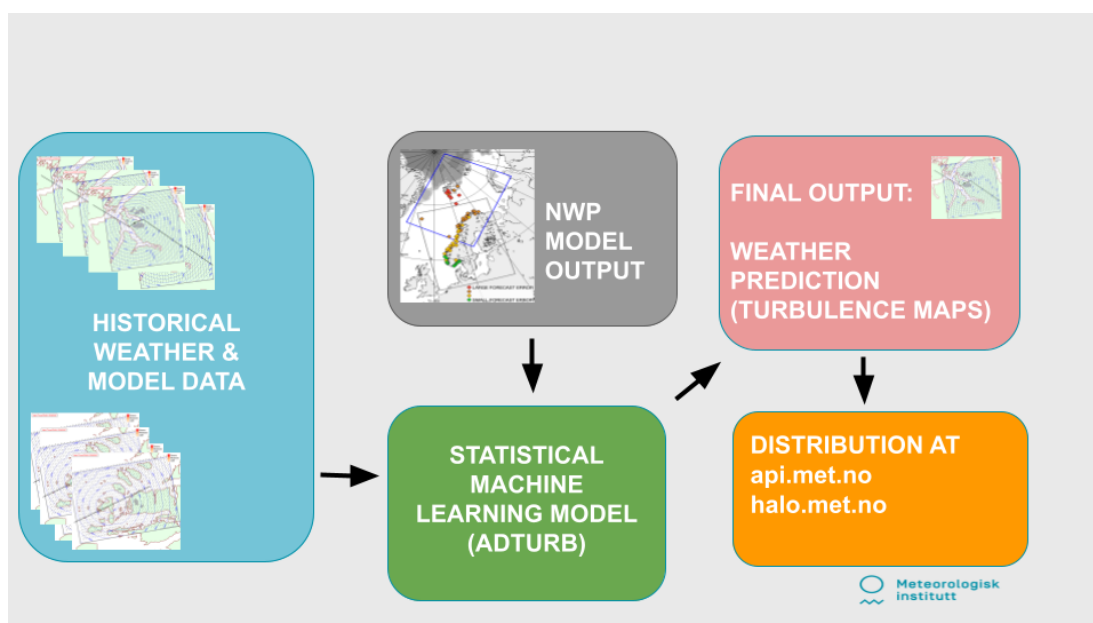


Figure 1: Sketch of the Turbulence Calculation System

The statistical machine learning model is deterministic and based on the minimization of absolute error. The model is trained on historical weather and NWP model data. With updated NWP model data (output), the final turbulence calculations are calculated (figure 1). Table 1 provides an overview of the turbulence calculations.

Table 1: Overview of the turbulence calculations

Task	Deliverables
The turbulence calculations	<ul style="list-style-type: none"> • 18h forecasting length • Updated every 3rd hours • Parameters: turbulence index, horizontal and vertical upper level wind • Distributed as horizontal and vertical maps (png files)
Distribution	<ul style="list-style-type: none"> • via api.met.no and halo.met.no

IMPORTANT: It is to be emphasised that the system is not an observation system measuring the real wind and turbulence conditions, but a system issuing prognosis based on the model calculations. The calculated results may therefore deviate from the real conditions at an actual time.

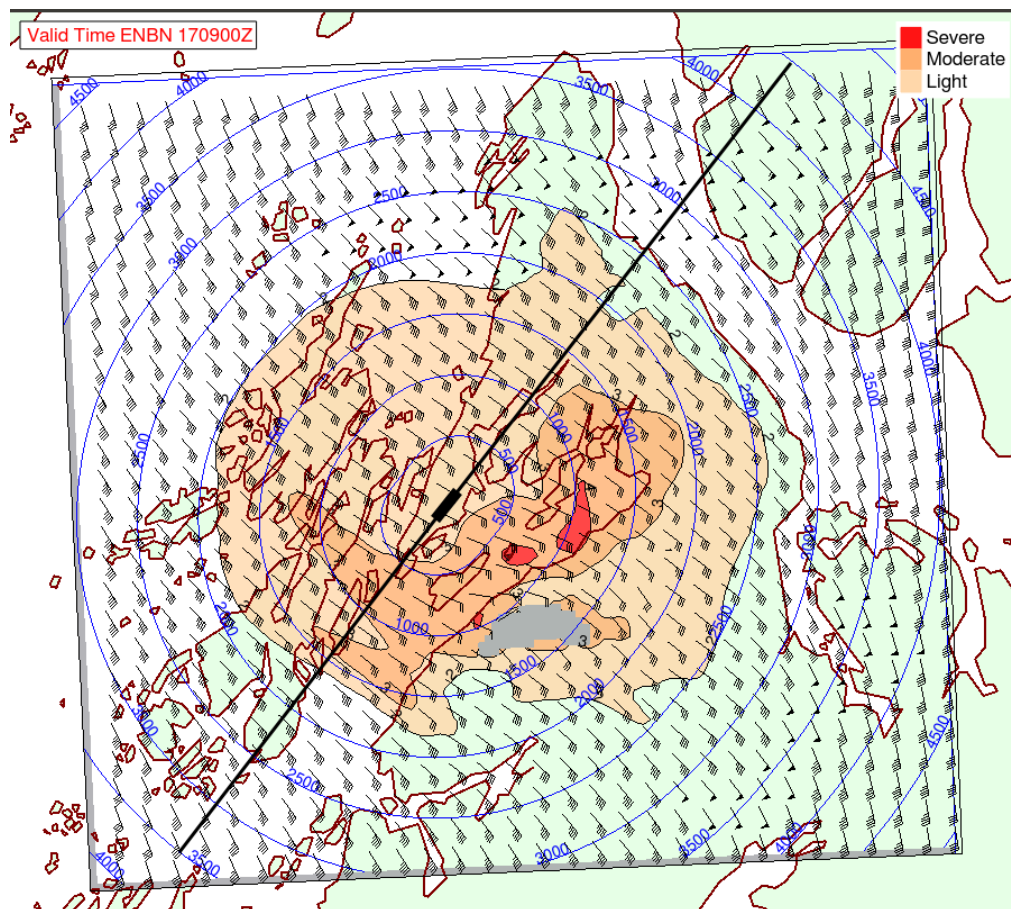
DESCRIPTION OF THE MAPS:

The maps are to be found at www.IPPC.no → MET - Meteo → Turbulence Maps

The information is shown in two planes:

- Horizontally (along the approach) where the wind- and turbulence conditions are shown in a funnel formed plane (angle of the plane is in accordance with the glide path angle).
- Vertical cross section along the approach/glide path.

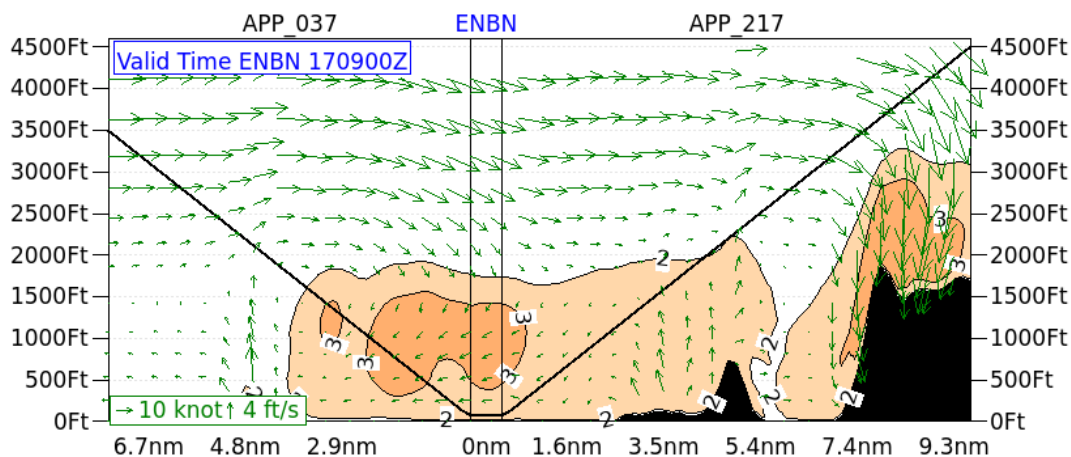
Horizontal Inflight Maps:



Map Description:

- Domain (outer square)
- Land contours (light blue/light green with, burgundy border)
- Sea (white areas)
- Terrain which is higher than the inflight surface at a specific location in the map are marked as dark gray areas
- The airport and runway are marked with a small black box
- The glidepath (black, thick line)
- The altitude in feet along the inflight surface is marked with blue circular lines
- Validity Time (DDHHMM in UTC) for a specific airport (ICAO code)
- Black wind arrows (direction, speed in knots)
- Turbulence Index - Light, Moderate and Severe with the associated colors as shown in the information box at the top right

Vertical Cross Section Maps:



Map Description:

- The map visualises a vertical cross section along the glidepath as marked as a black thick line in the horizontal maps above (along approach 'APP_NNN' and 'APP_NNN')
- The inflight glidepath is marked as a black, thick, slanted line
- y-axis: height in feet
- x-axis: nm from the airport
- The two thin, black vertical lines approx. in the middle of the map shows the location of the runway of the specific airport
- Terrain, such as hills, mountains etc are marked as black areas
- Green arrows visualise the horizontal and vertical wind component as a vector (wind speed according to the length of the arrows)
- The turbulence index is marked with the same colors as for the horizontal maps (Light, Moderate, Severe TURB)

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