



2010-nda aasta augustitorm ja selle modelleerimine HARMONIE'ga

Velle Toll

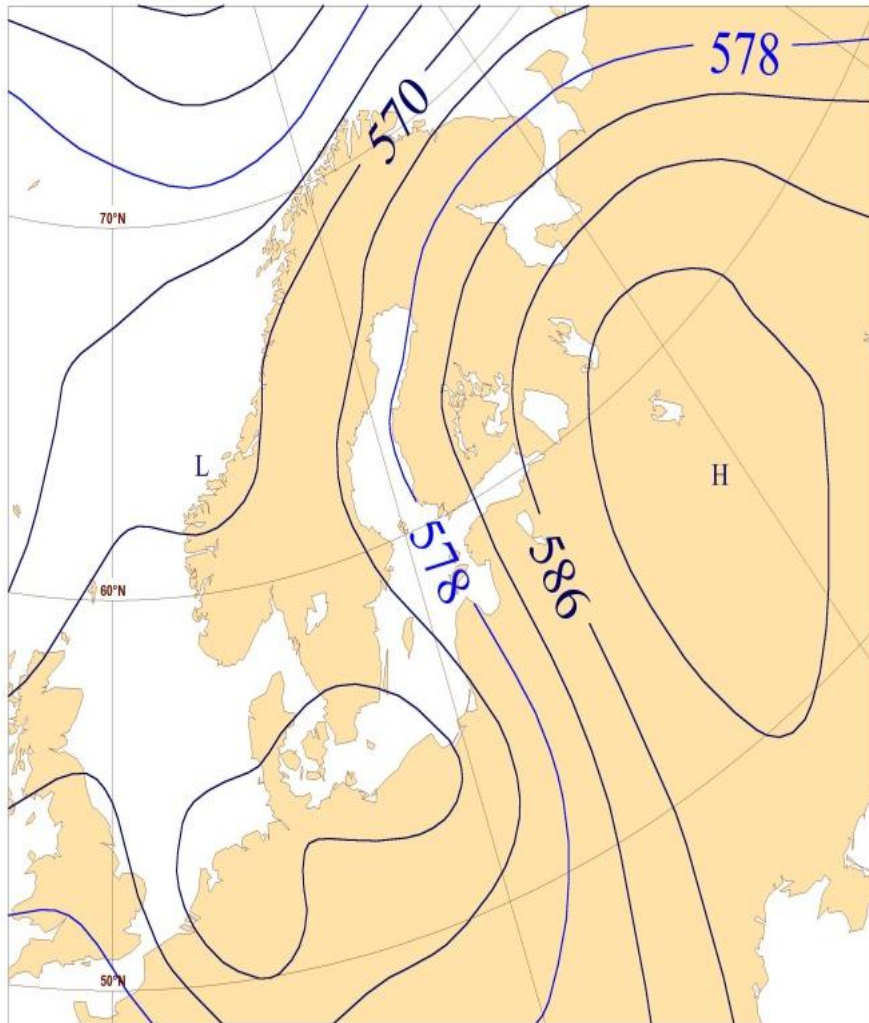
EMHI arendusosakond, TÜ

Mis on HARMONIE?

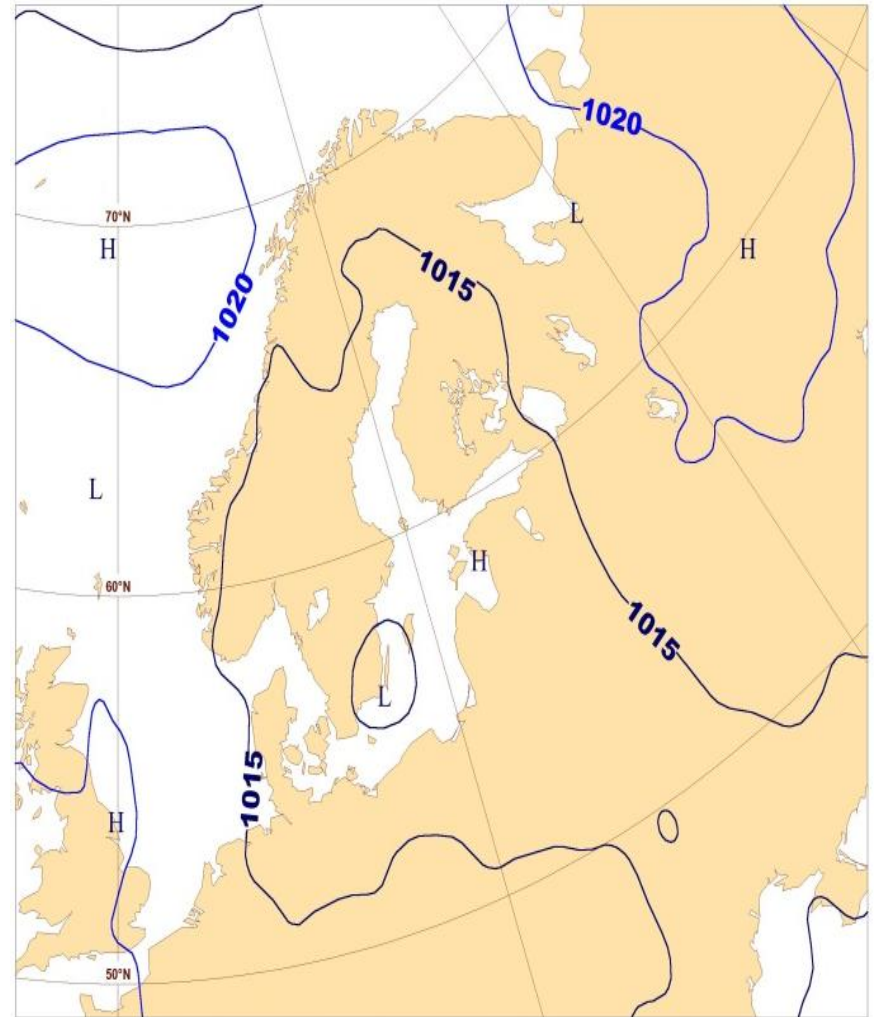
- HARMONIE on mittehüdrostaatiline sügavat konvektsiooni ilmutatud kujul arvutav mudel.
- Vaikimisi võrgusammuks on 2.5 km.
- HARMONIE lahutus võimaldab modelleerida suuri äikesetormi rakke ja nendega seotud fronte.
- Lokaalsete geograafiliste erinevuste mõjude täpsem modelleerimine.

2010-nda aasta augustitorm

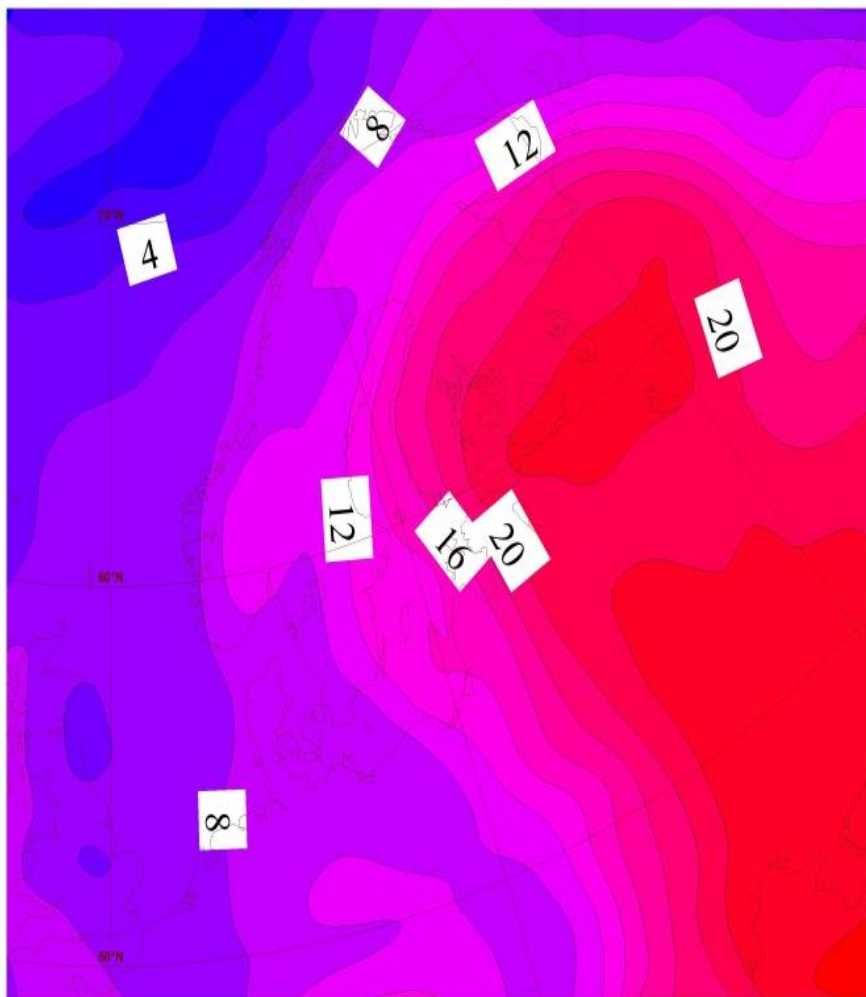
- 8-ndal augustil 2010-ndal aastal liikus üle Eesti tugev sirgjooneline äikesetorm (derecho), mida EMHI operatiivne HIRLAM-mudel ei suutnud prognoosida.
- Tormi teekond on jälgitav radaripiltidel, mille põhjal on tormiga kaasnenud kaarkaja liikumiskiirus ligikaudu 25 m/s
- Tugevamad automaatjaamade poolt mõõdetud tuulepuhangud olid u. 35 m/s ja rohkem kui 15 m/s suuremal alal.



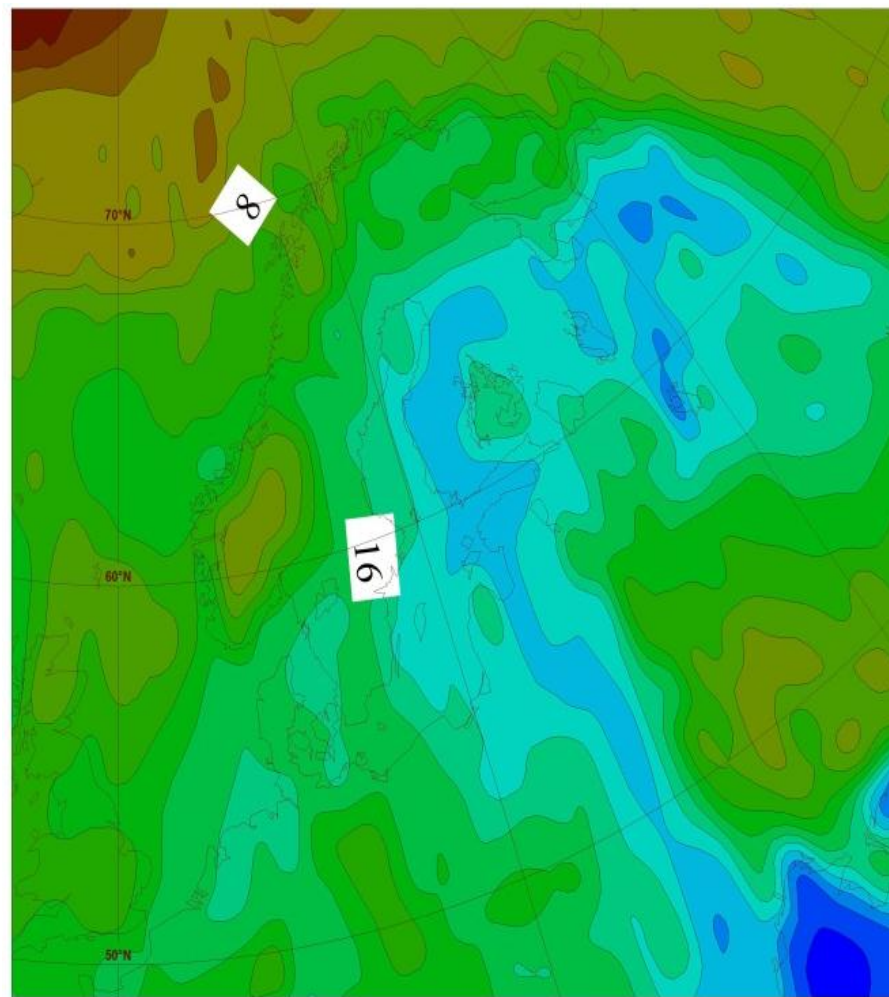
500 hPa geopotentsiaalse kõrgus (dam)
08 august 2010 kell 12 UTC



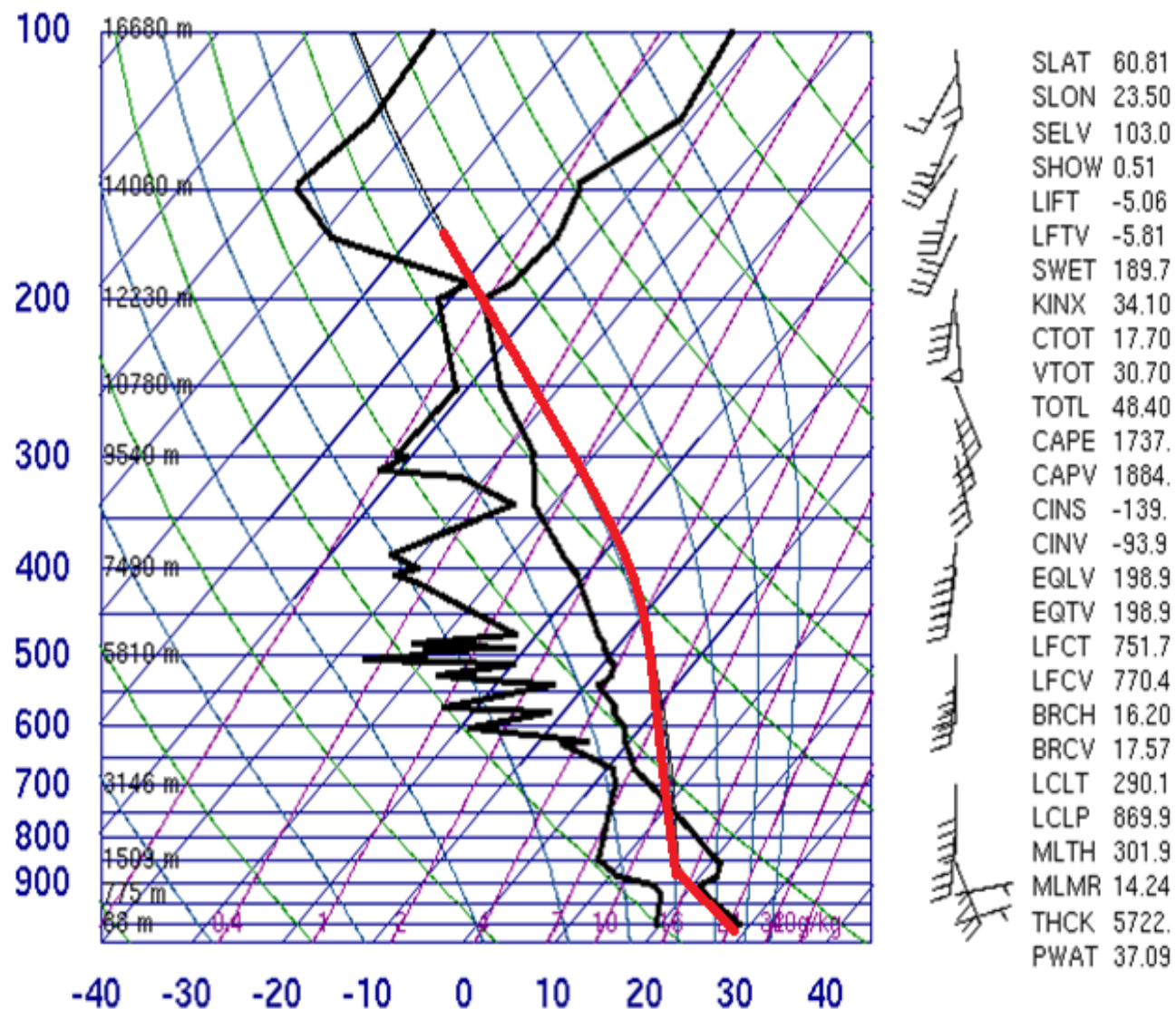
Merepinnale taandatud õhurõhk (hPa)
08 august 2010 kell 12 UTC



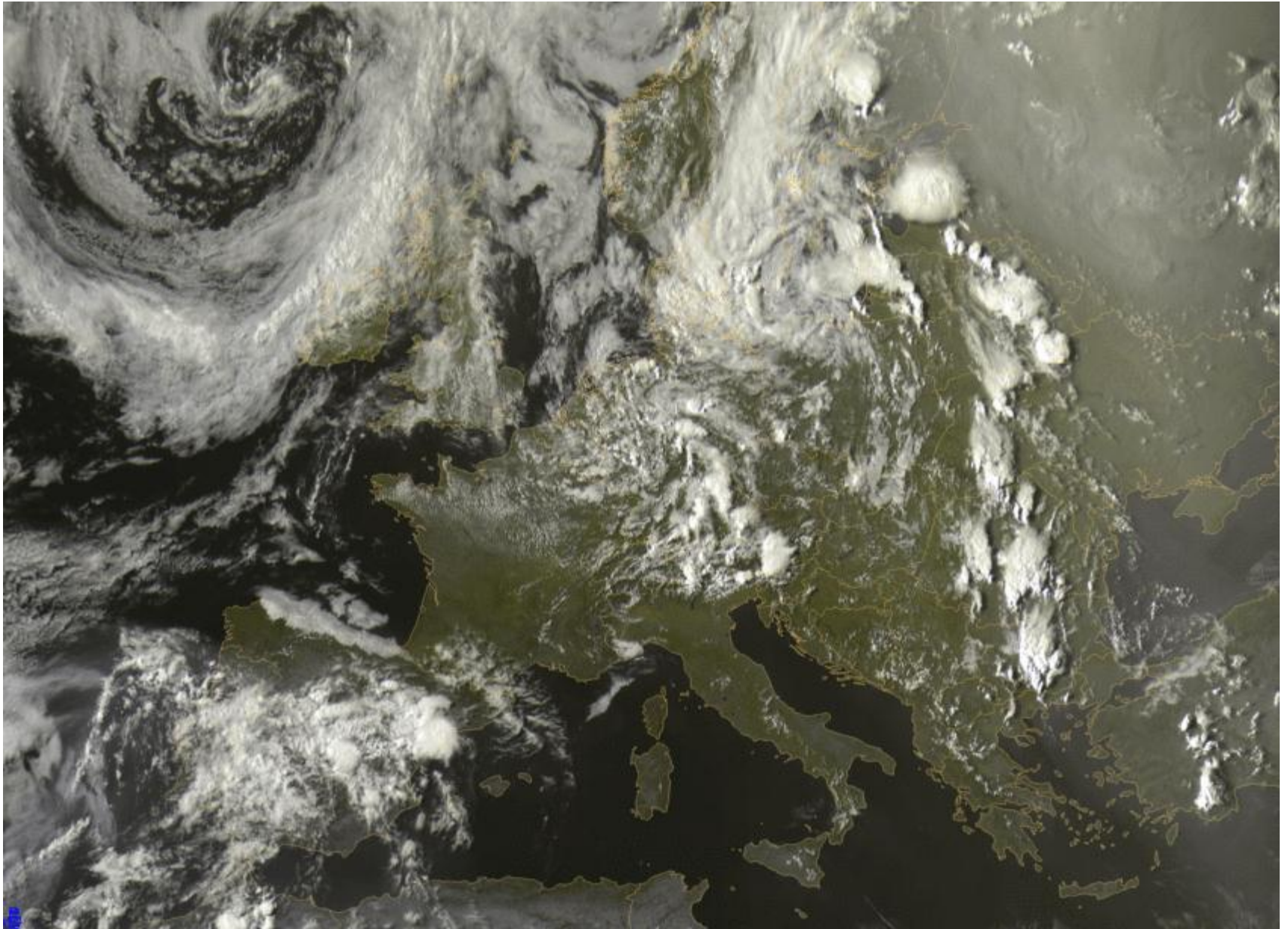
Temperatuur °C 850 hPa rõhutasemel
08 august 2010 kell 12 UTC

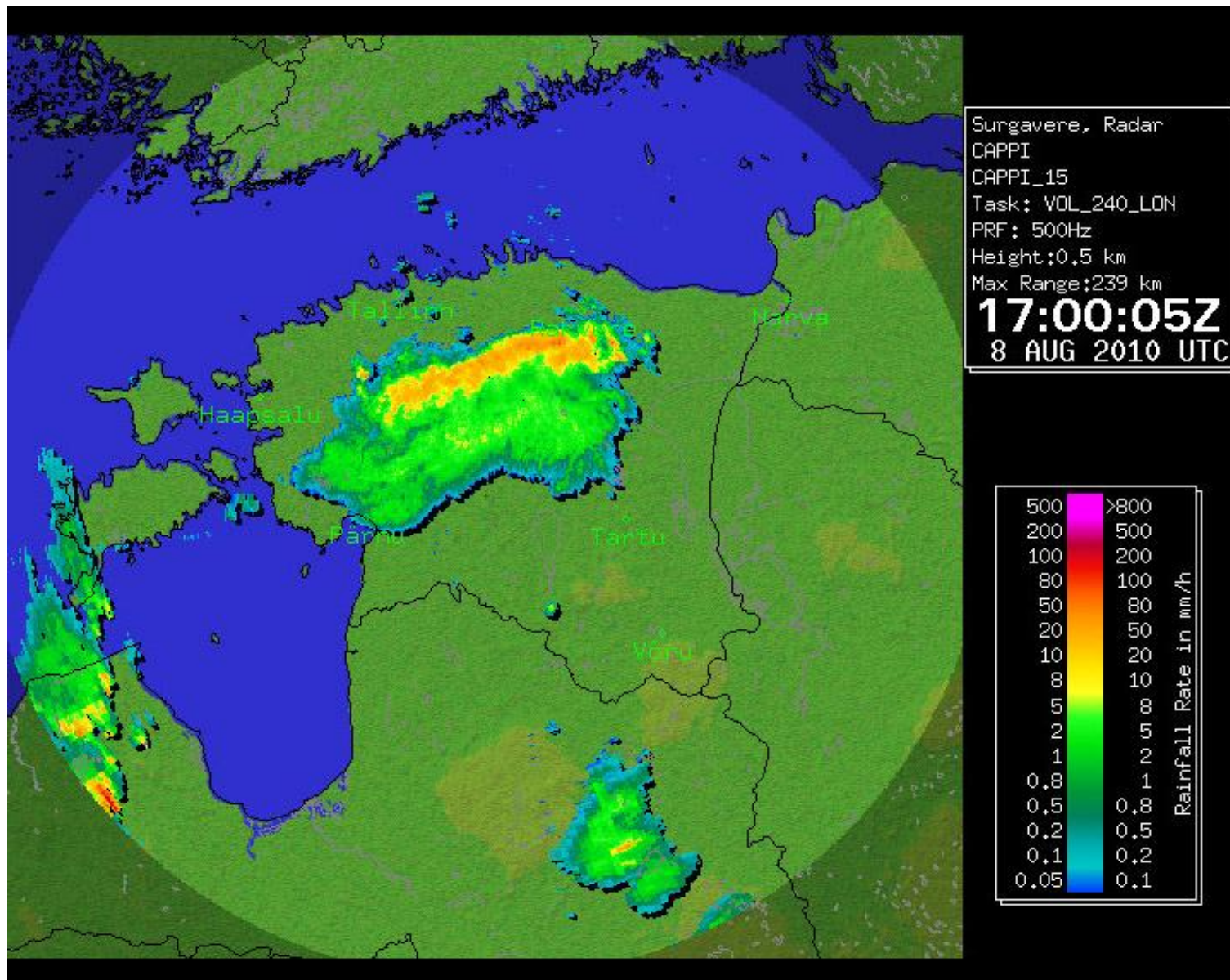


2m kastepunkti temperatuur °C
08 august 2010 kell 12 UTC

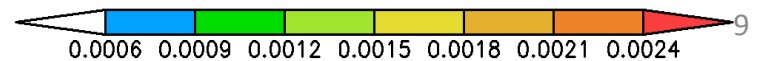
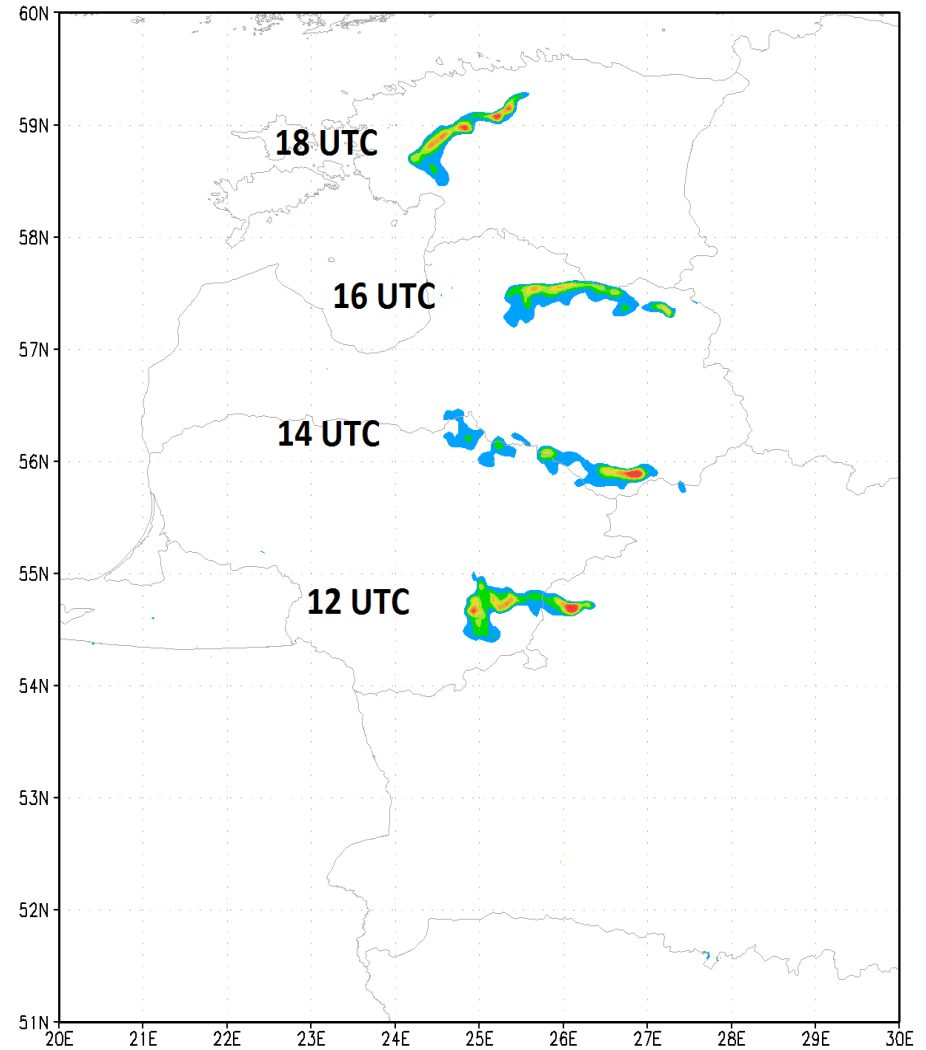
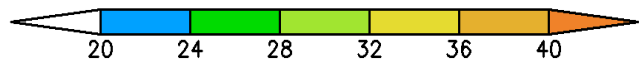
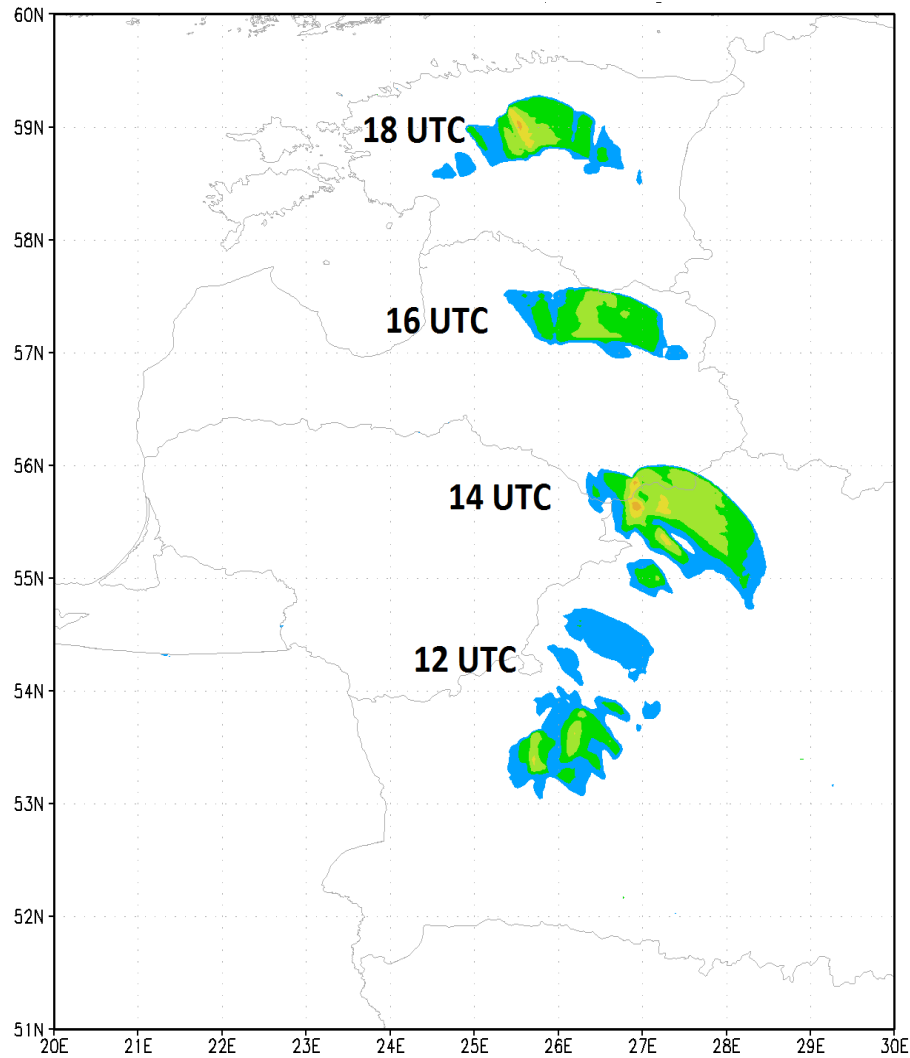


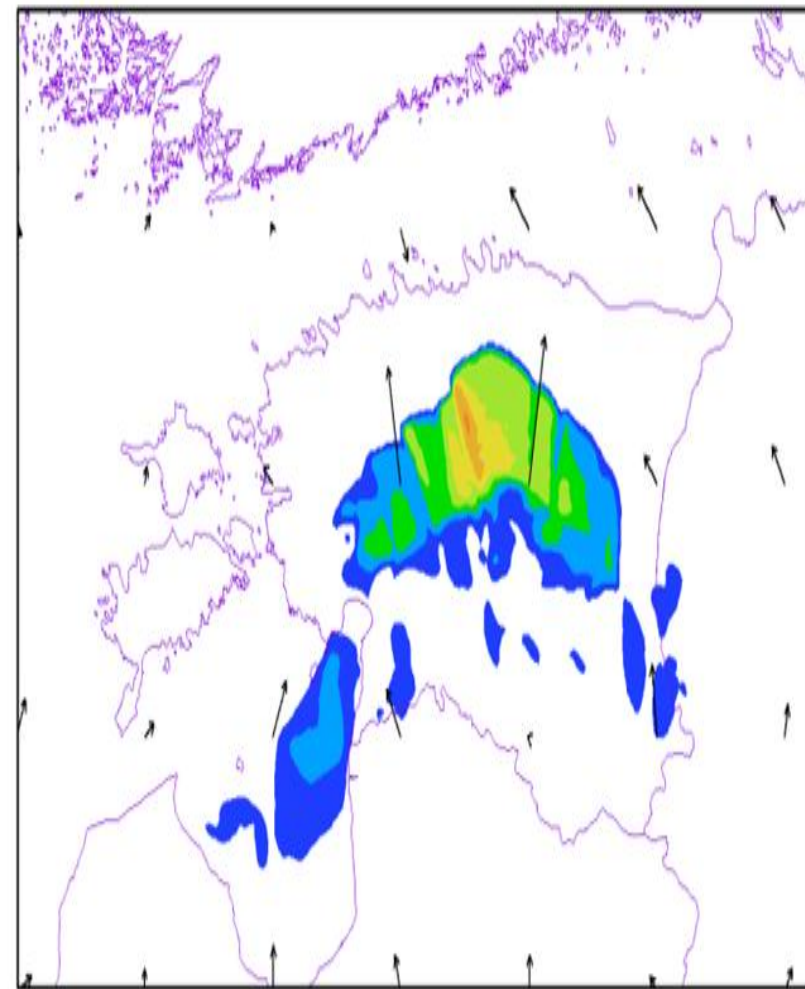
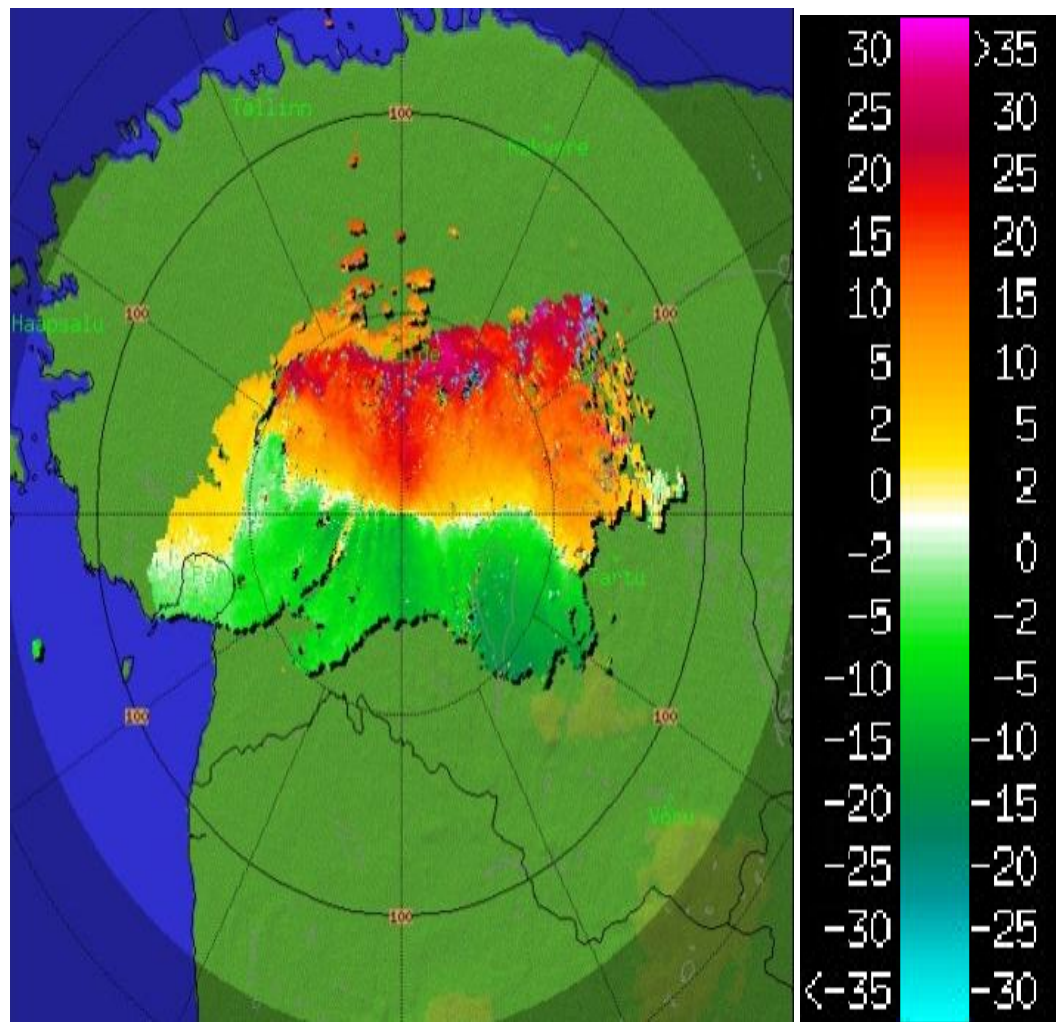
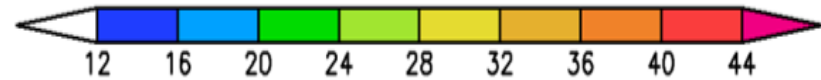
Atmosfääri sondeering Jokioinenis 8-ndal augustil kell 12 UTC 2010 [1]



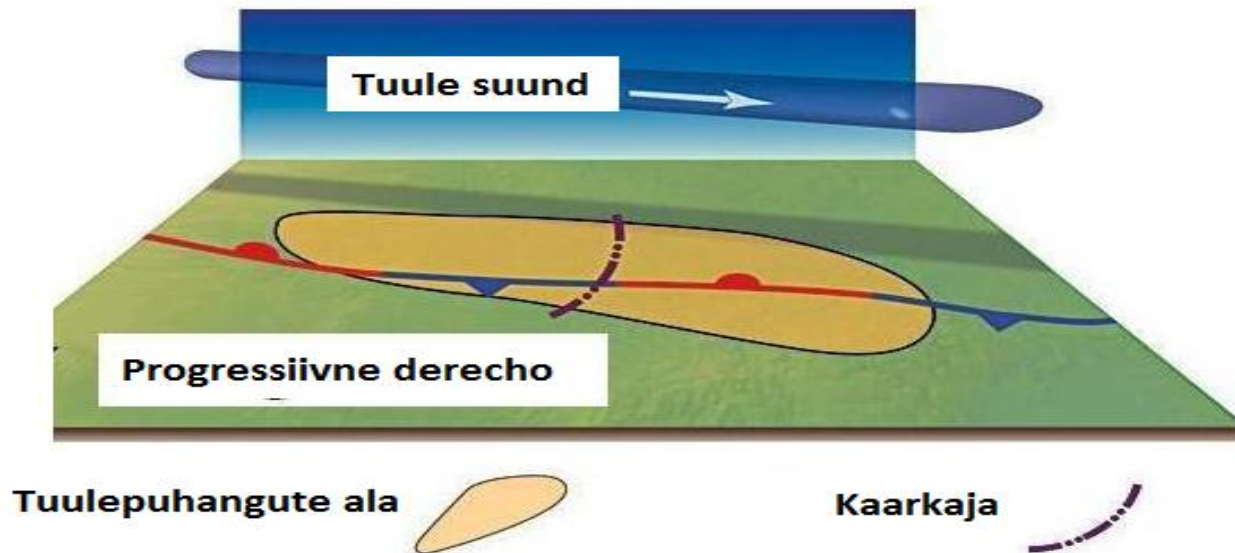
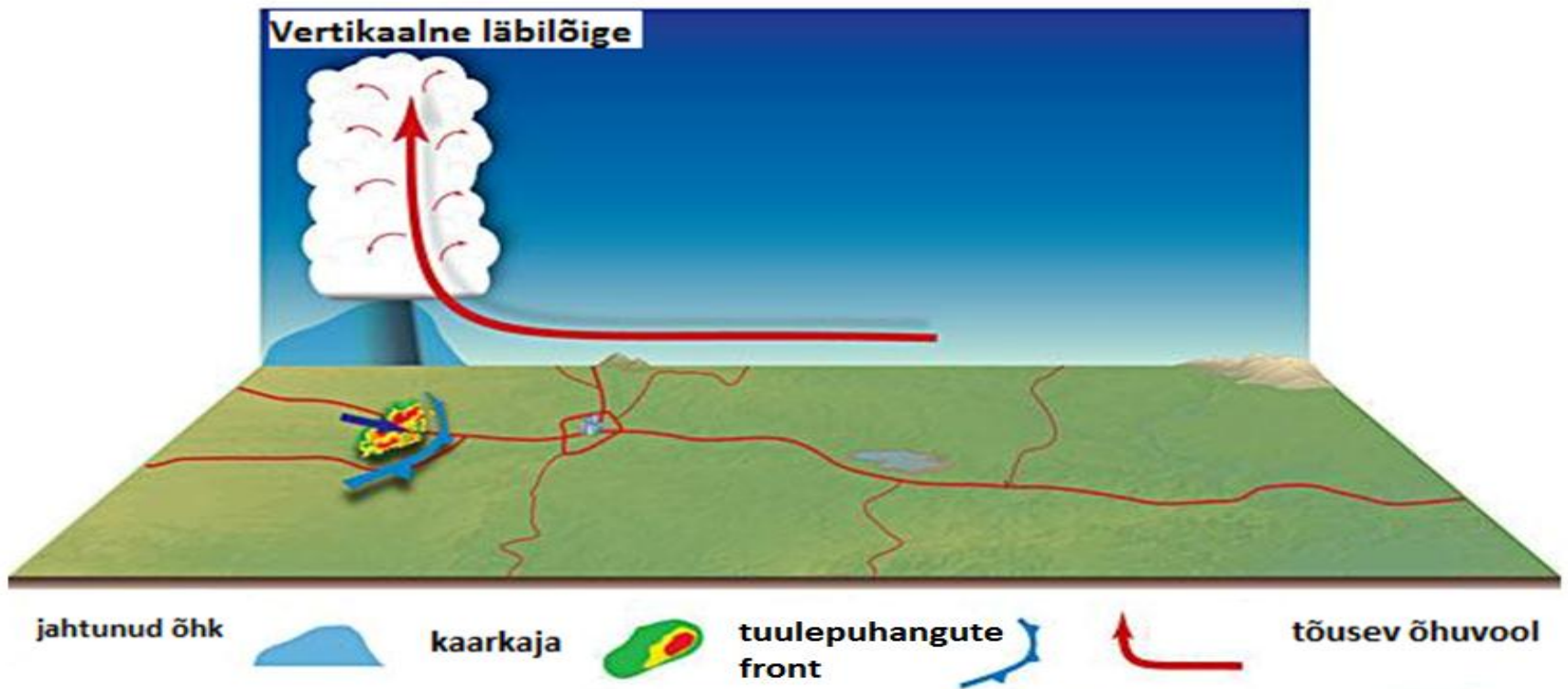


Tormi teekond tuulepuhangutena (m/s) ja sademete intensiivsustena (mm/s) HARMONIE'ga modelleerituna



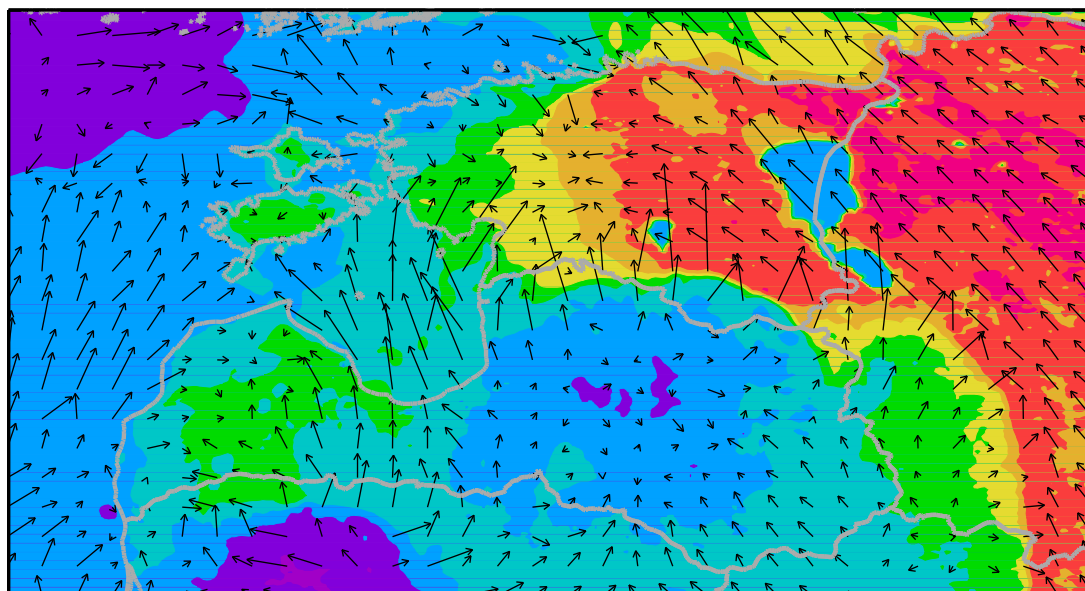
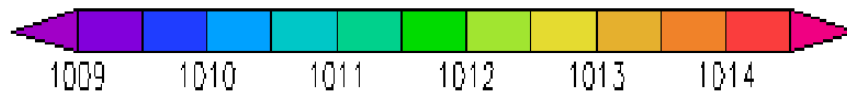
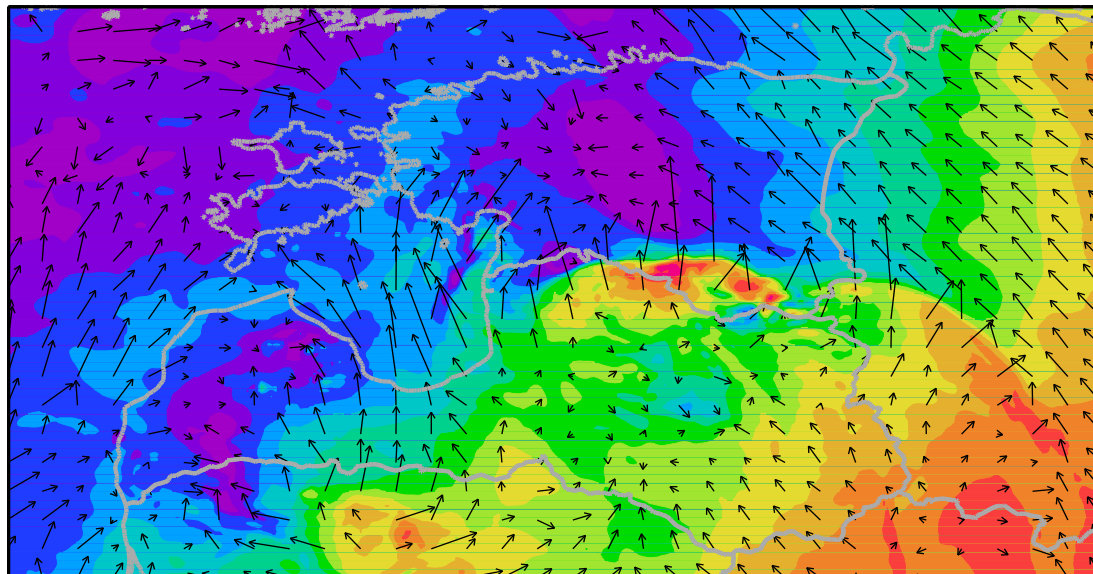


Tuule kiirus (m/s) radaril ja tuulepuhangud (m/s) HARMONIE väljundis

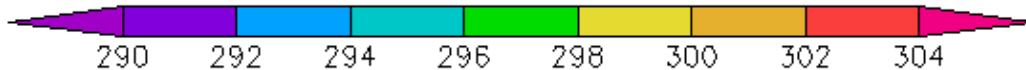


[3]

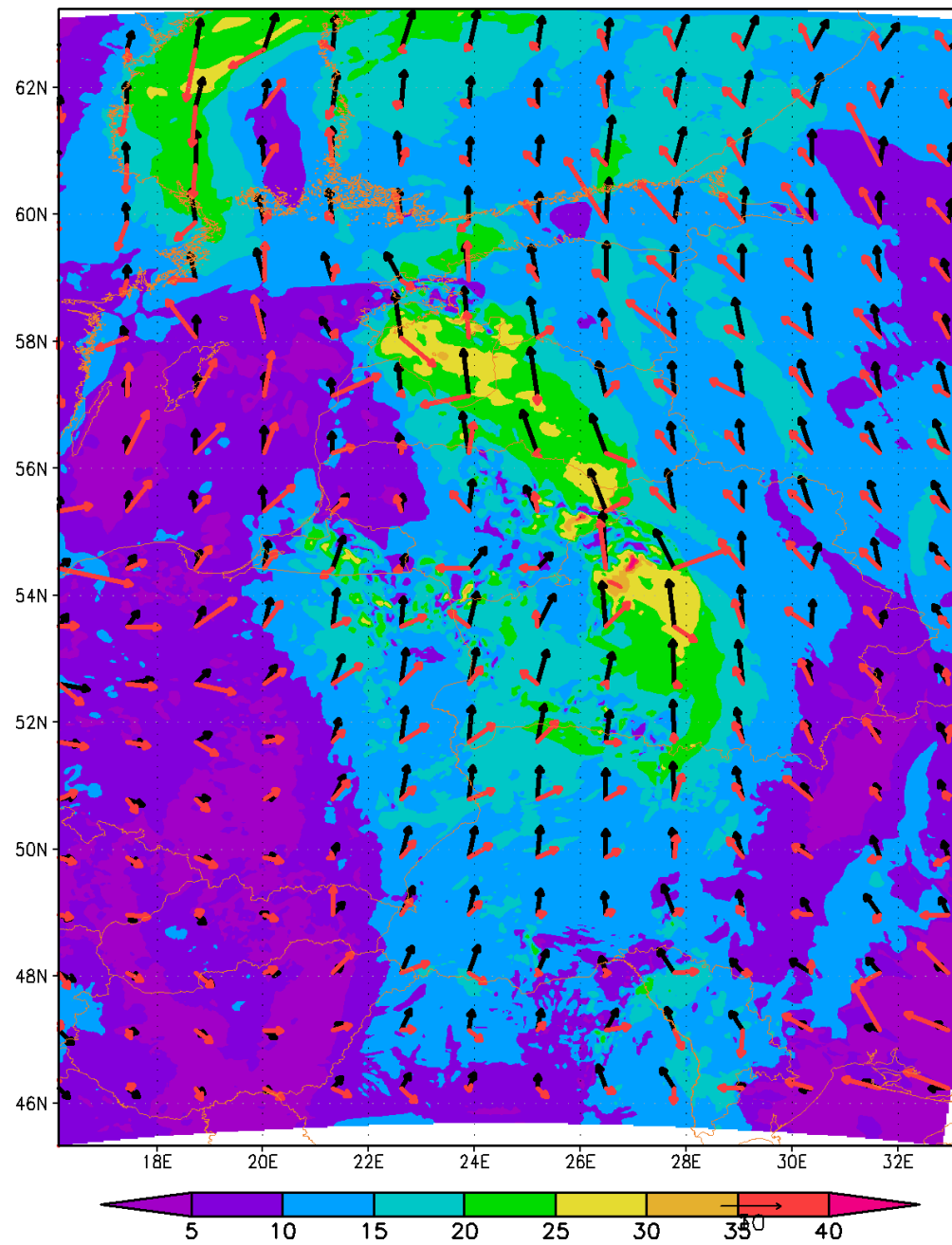
**Tormiga kaasnenud
kõrgema rõhuga ala
õhurõhuna taandatuna
merepinna (hPa)**

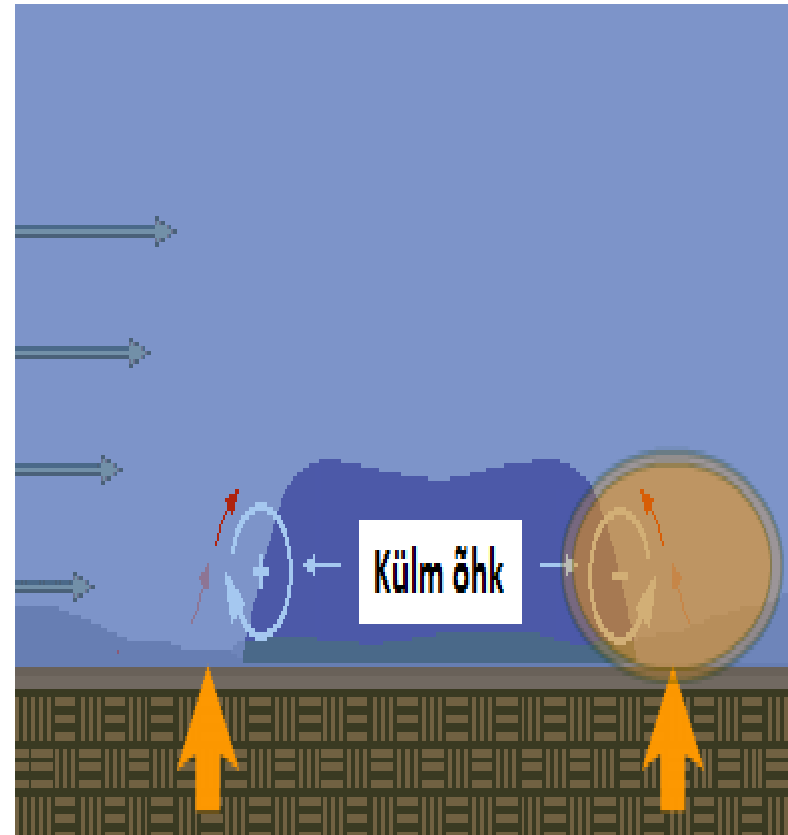
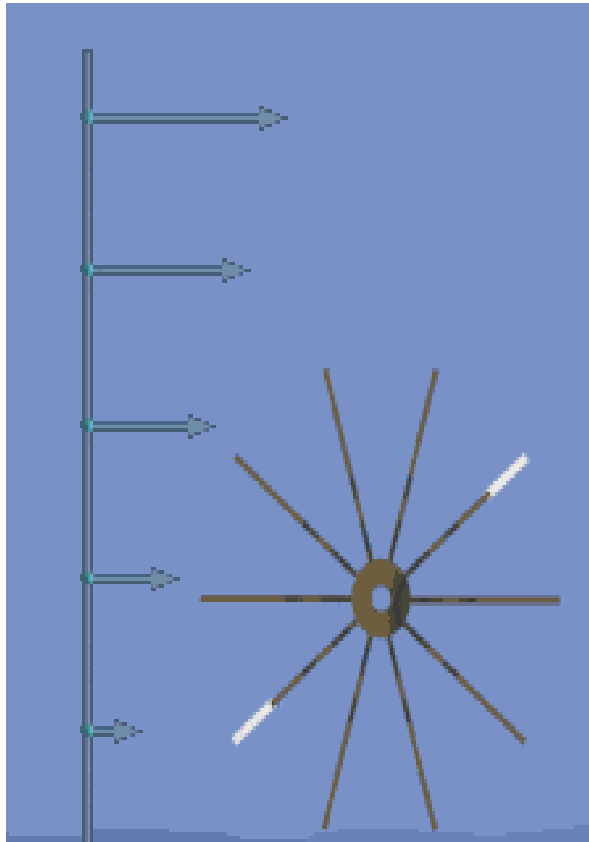
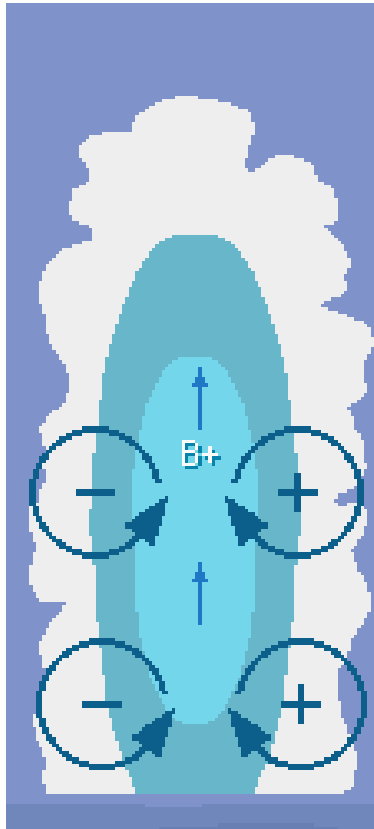


**ja külma õhu basseini
temperatuurina (K)
2m kõrgusel**



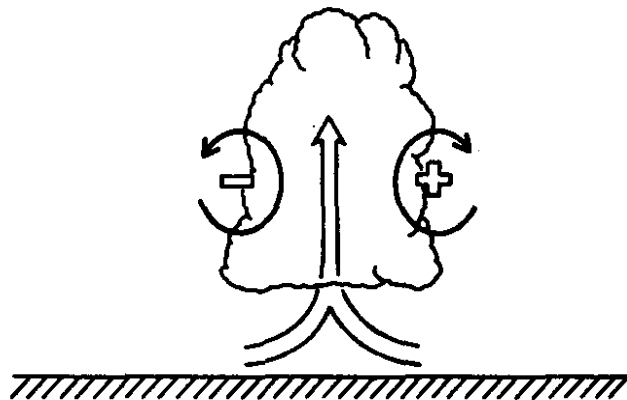
(700–1000) mb Tuulenihe (m/s) kell 13 GMT



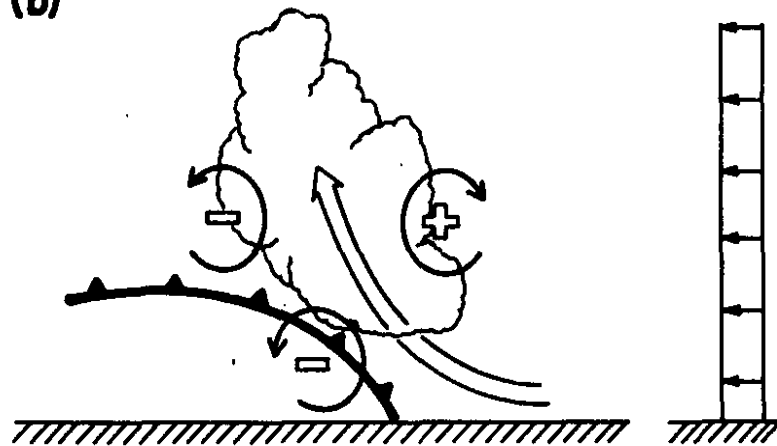


Ujuvusliku ebastabiilsuse horisontaalse gradiendi ja tuuleniuke poolt põhjustatud horisontaalne pööriselisus [4]

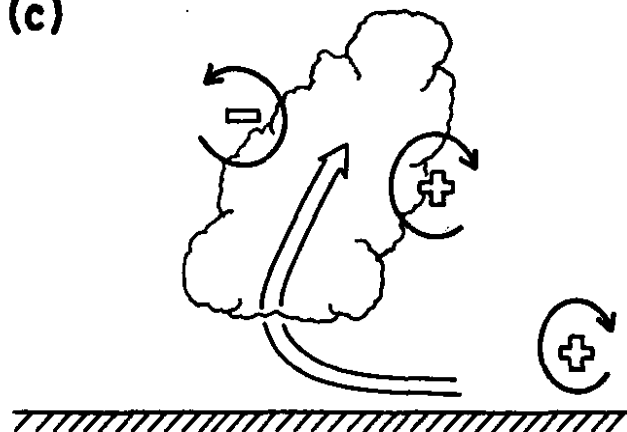
(a)



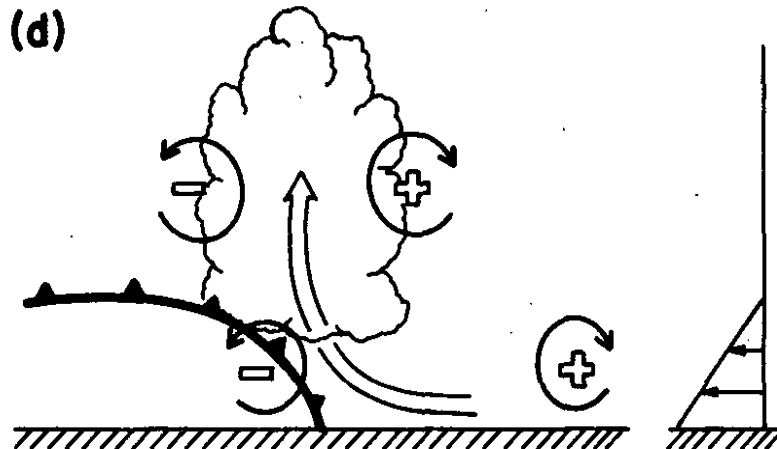
(b)



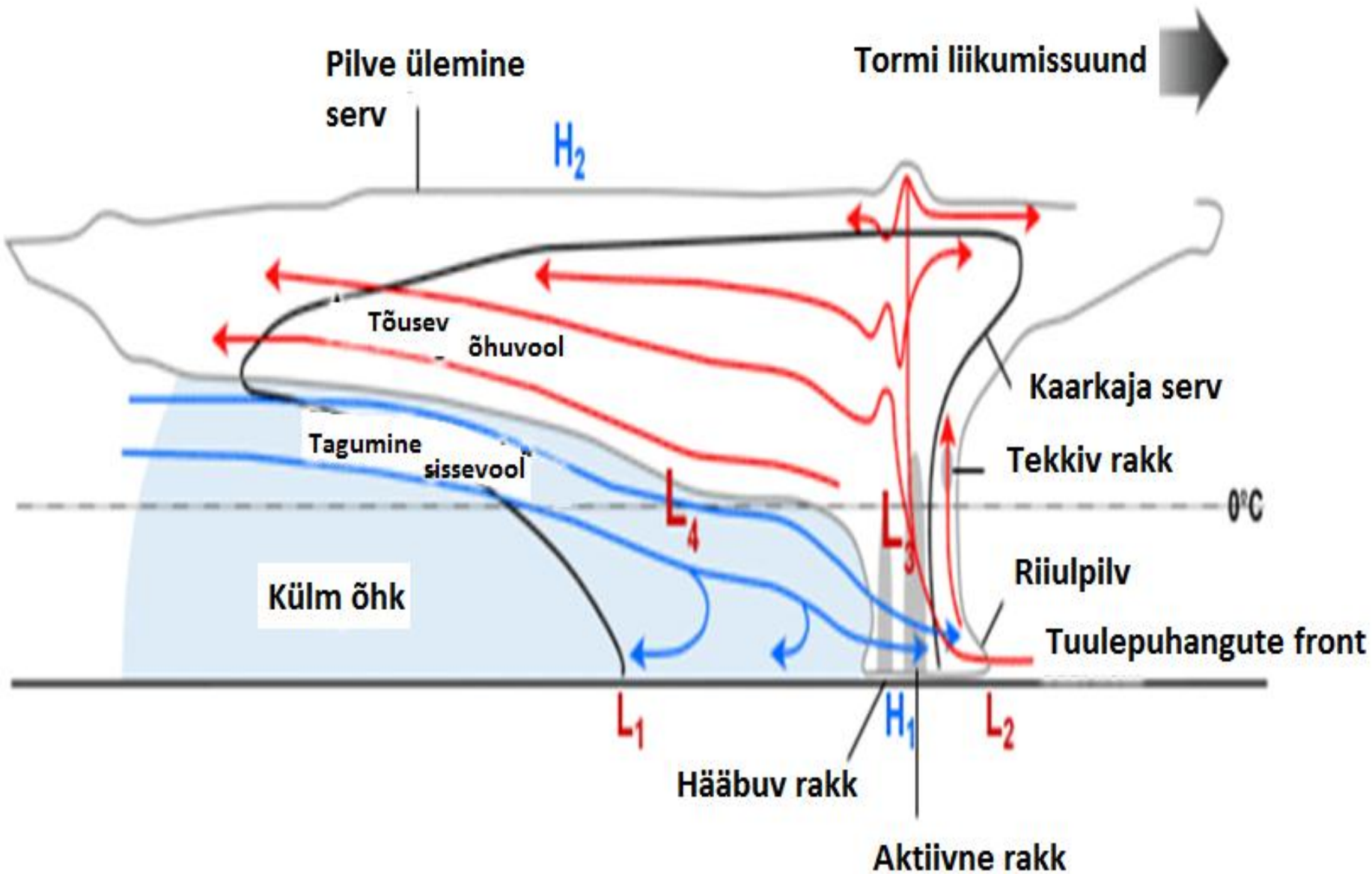
(c)



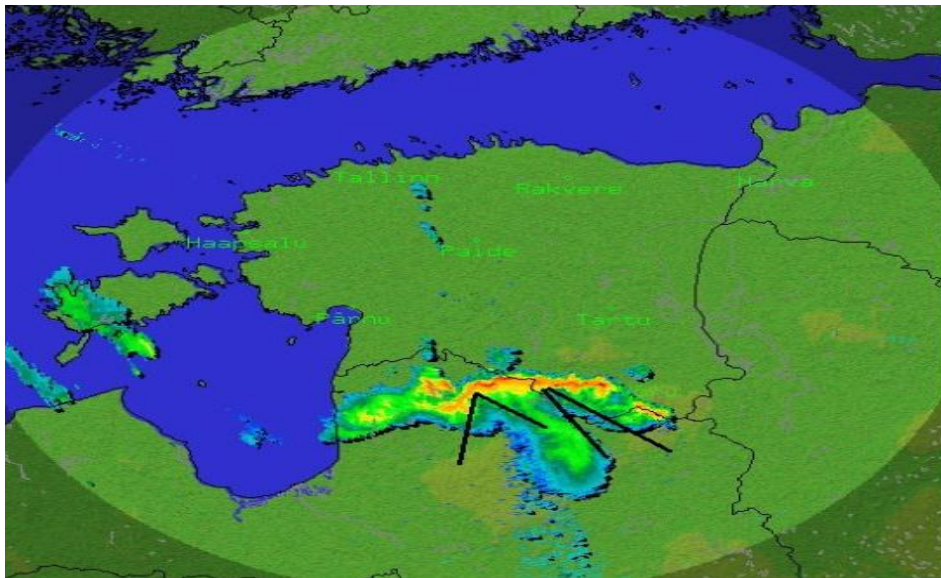
(d)



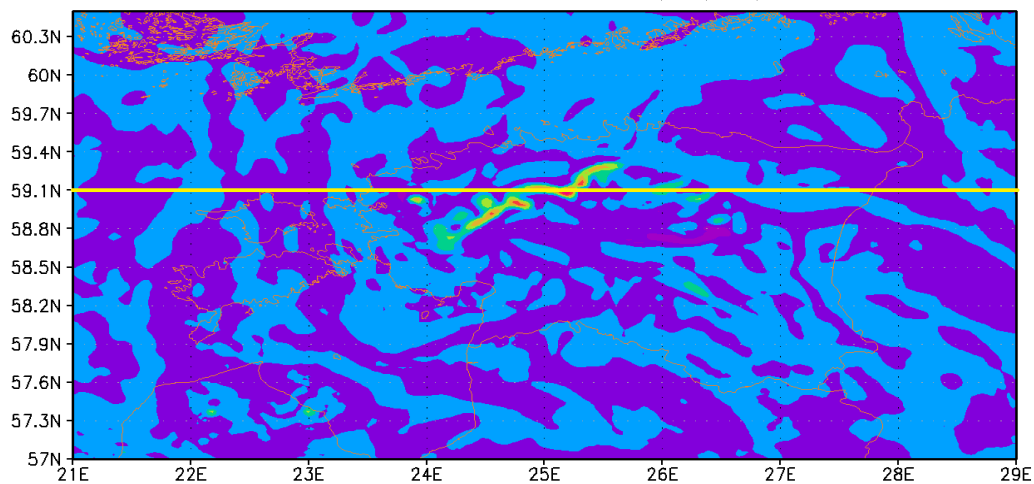
Tõusev õhuvool mõjutatuna külma õhu basseinist ja tuulenihest [5]



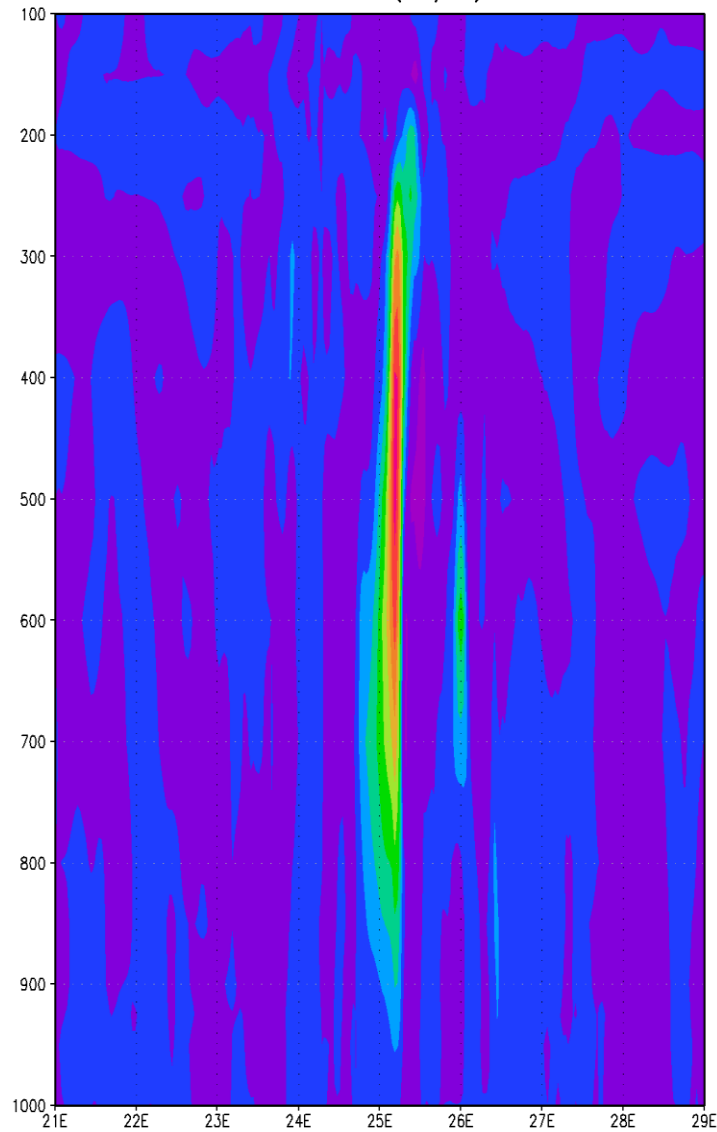
[4]

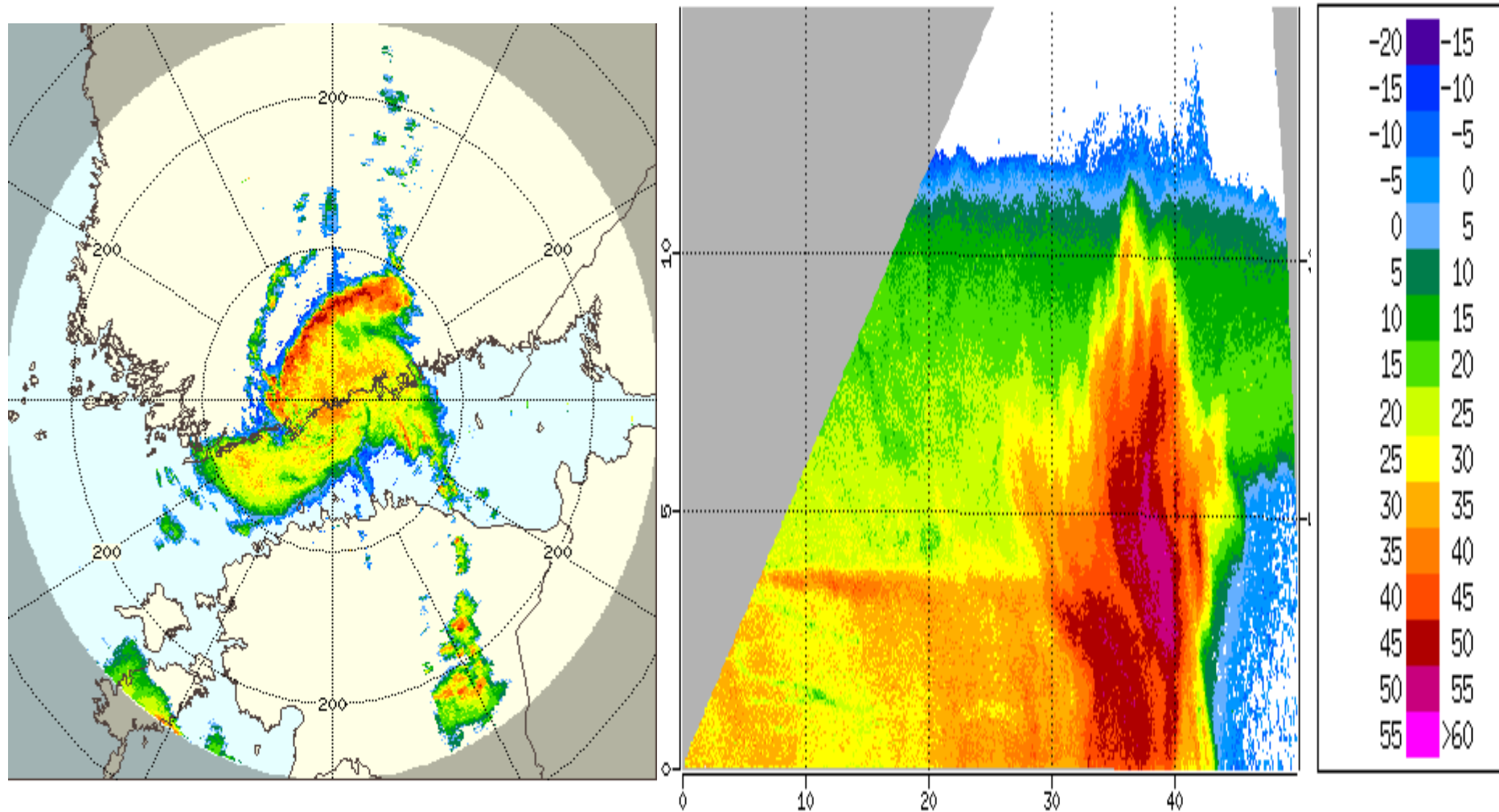


700mb Vertikaalsed kiirused (m/s) kell 18 GMT



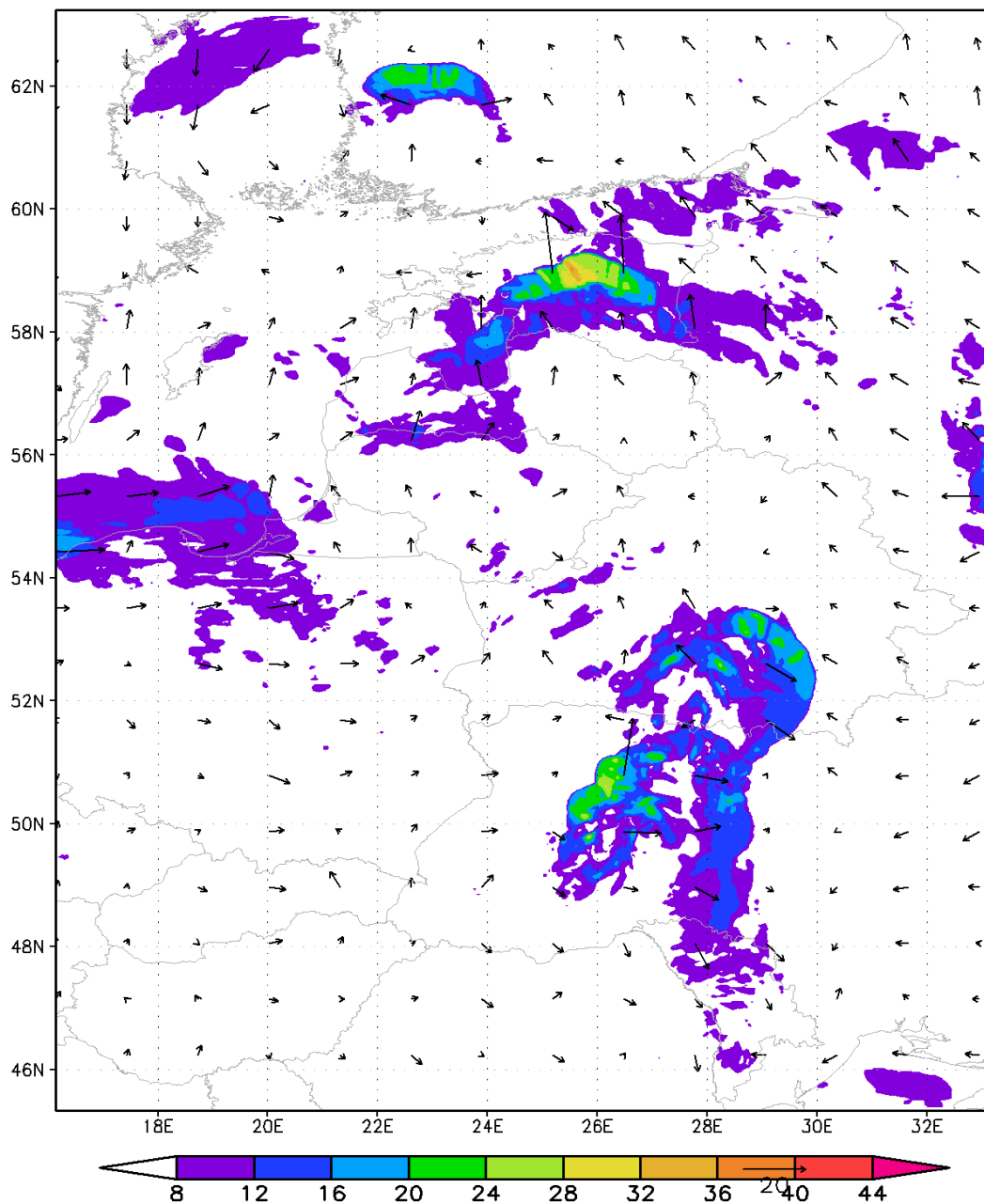
Vertikaalsed kiirused (m/s) kell 18 GMT





Tormi horisontaalne ja vertikaalne läbilõige peegeldavusest (dBZ) nähtuna Soomes Kumpula radaril kell 19 UTC [6]

Tuulepuhangud (m/s) 08 aug kell 18 GMT



Kasutatud allikad

[1] Wyomingi Ülikooli atmosfääri sondeeringute andmebaas

URL = <http://weather.uwyo.edu/upperair/sounding.html>

[2] Satellidipiltide andmebaas

URL = <http://www.sat24.com/>

[3] NOAA derecho veebileht

URL = <http://www.spc.noaa.gov/misc/AbtDerechos/derechofacts>

[4] UCAR meteoroloogia kursuste veebileht

URL = <https://www.meted.ucar.edu/>

[5] Rotunno, R.J., J. B. Klemp, and M. L. Weisman, 1988: A theory for strong, long-lived squall lines. *J. Atmos. Sci.*, **45**, 463-485.

[6] Matti Leskinen'i veebileht Helsingi Ülikoolis

URL = <http://www.helsinki.fi/~mleskine/sateet/100808.html>

Tänan!

