Icelandic Met Office

Samvirkni dreifilíkans og öskuathugana

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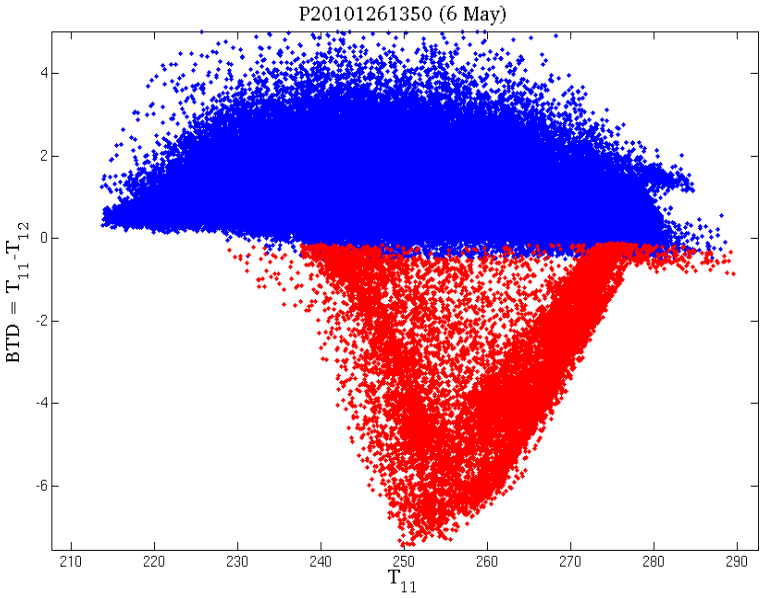
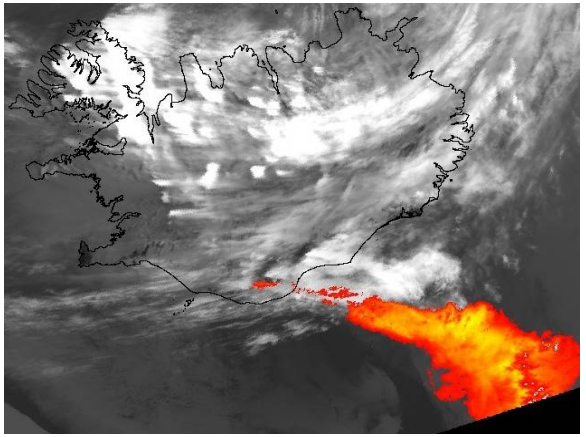
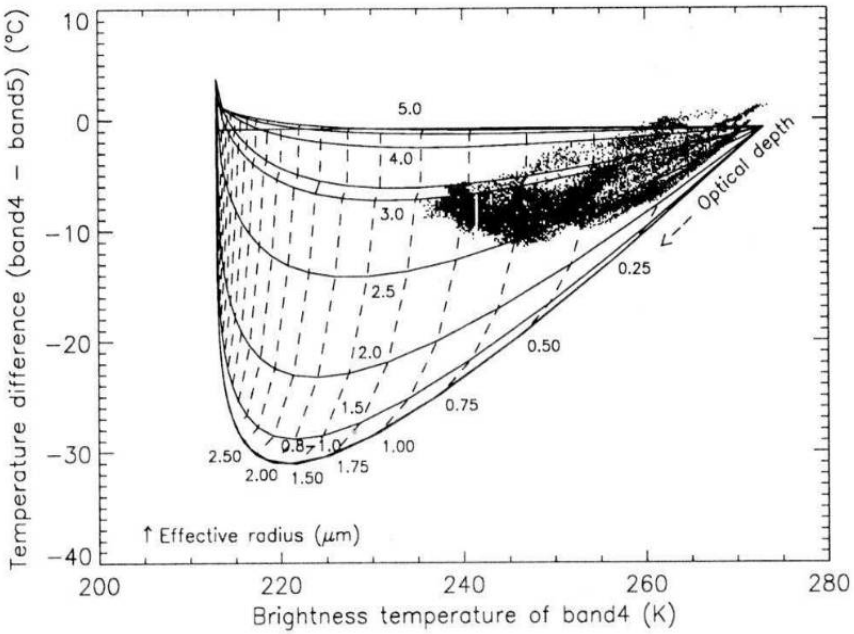
Sumarþing á Veðurstofunni, 29. maí 2012

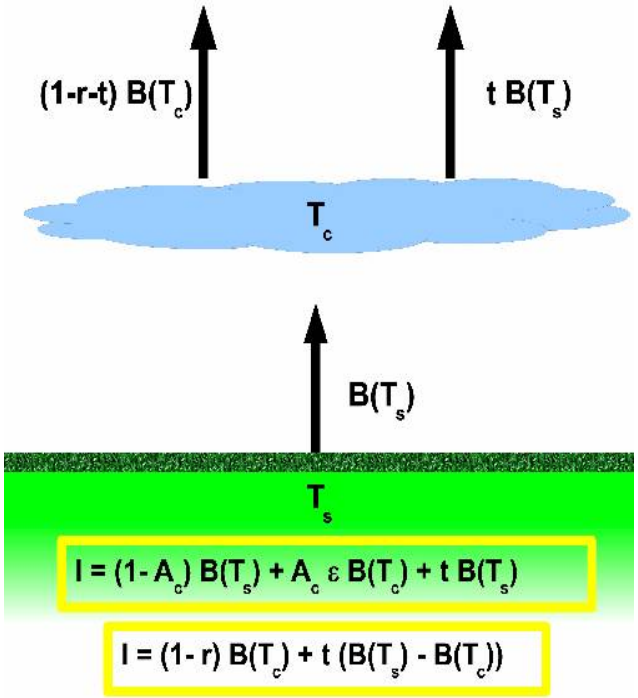
Greining ösku með hitarásum veðurtungla

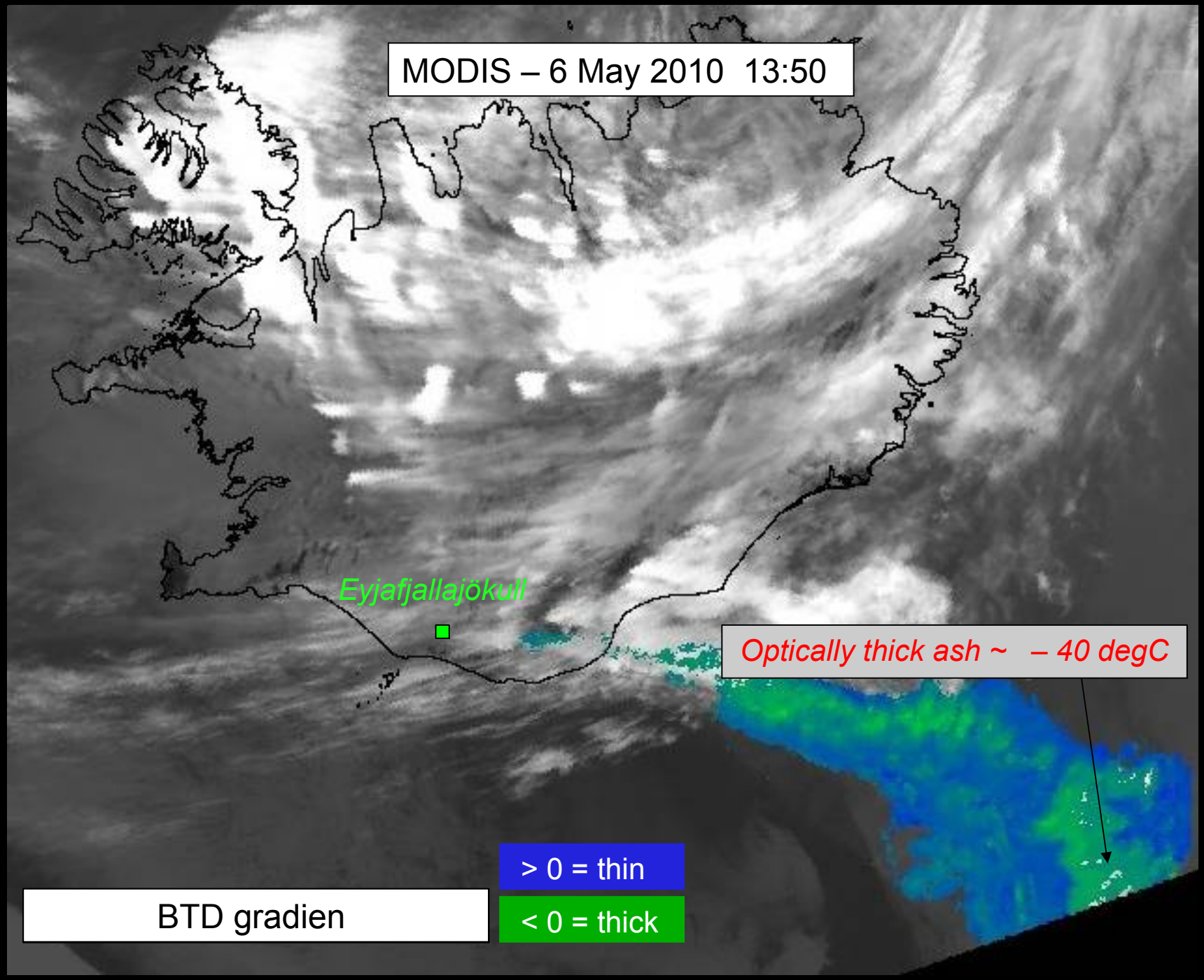
- **þröskuldur á birtuhitastigsmun hitarása, BTD=T_11 –T_12**
- **BTD < 0 svifaska, BTD > 0 vatnssky**
- **Hægt er að álykta magn, hæð og agnastærð ösku er byggð á Mie ljóstvístrun (Wen & Rose 1994, Prata 1989), en**
  - margar óvissur: agnastærðardreifing, hæð ösku, ljósbrotsstuðull
  - heit umræða um nálganir: eitt þunnt öskulag, kúlulaga kýr ...


P20101261350 (6 May)
BTD = T_{11}-T_{12}
T_{11}
4
2
0
-2
-4
-6
210
220
230
240
250
260
270
280
290



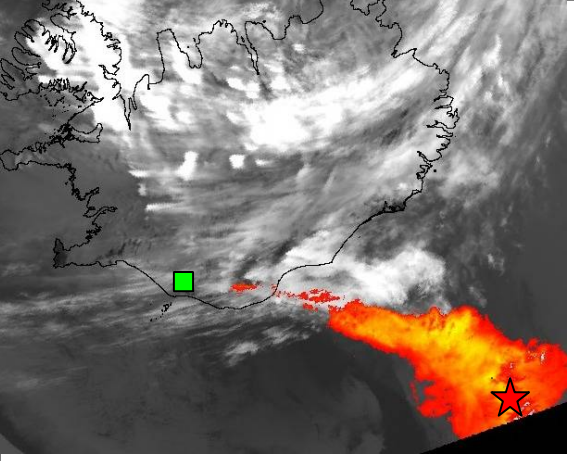

Temperature difference (band4 − band5) (°C)
Brightness temperature of band4 (K)
↑ Effective radius (μm)
Optical depth
5.0
4.0
3.0
2.5
2.0
1.5
1.0
0.8
0.75
0.50
0.25
2.50
2.00
1.50
1.75
1.00
10
0
−10
−20
−30
−40
200
220
240
260
280


(1-r-t) B(T_c)
t B(T_s)
T_c
B(T_s)
T_s
I = (1- A_c) B(T_s) + A_c ε B(T_c) + t B(T_s)
I = (1- r) B(T_c) + t (B(T_s) - B(T_c))

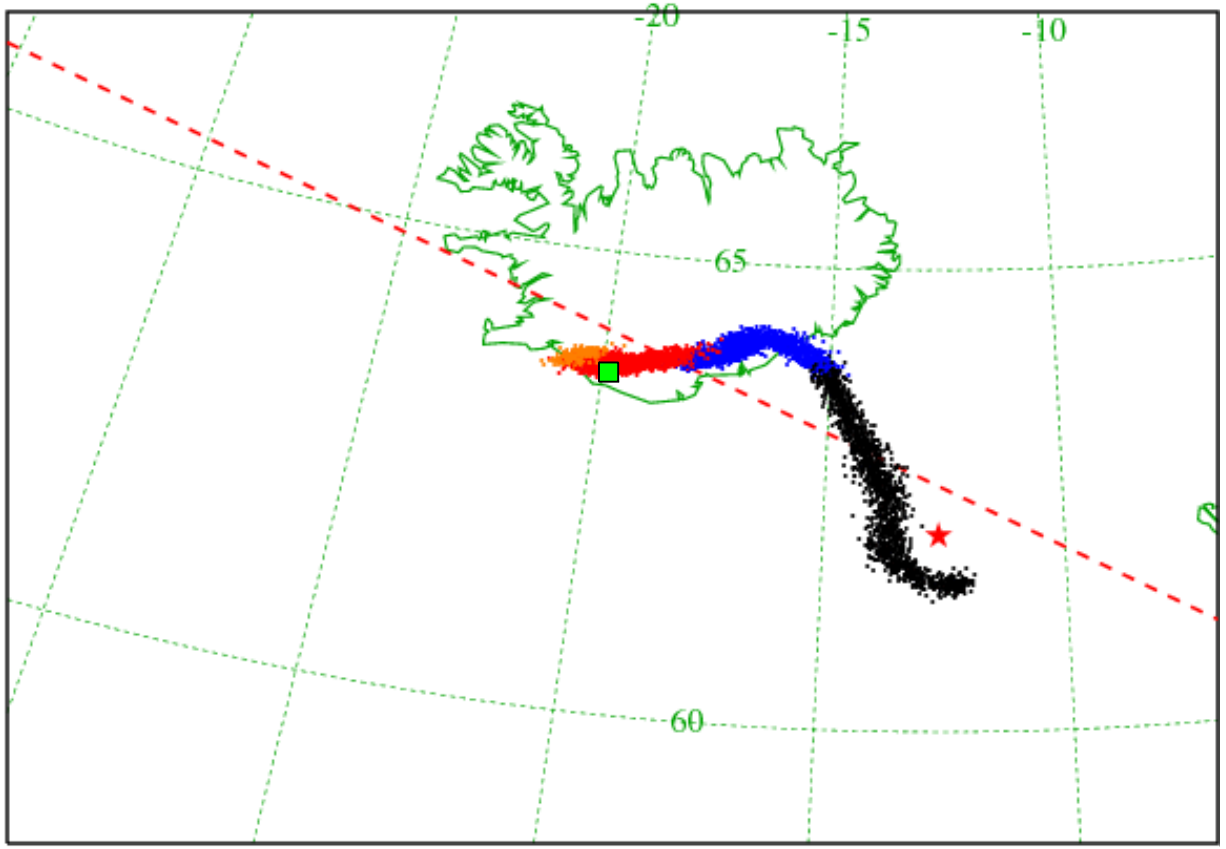

MODIS – 6 May 2010 13:50
Eyjafjallajökull
Optically thick ash ~ – 40 degC
BTD gradien
> 0 = thin
< 0 = thick

Samlögun öskugreiningar og dreifilíkans

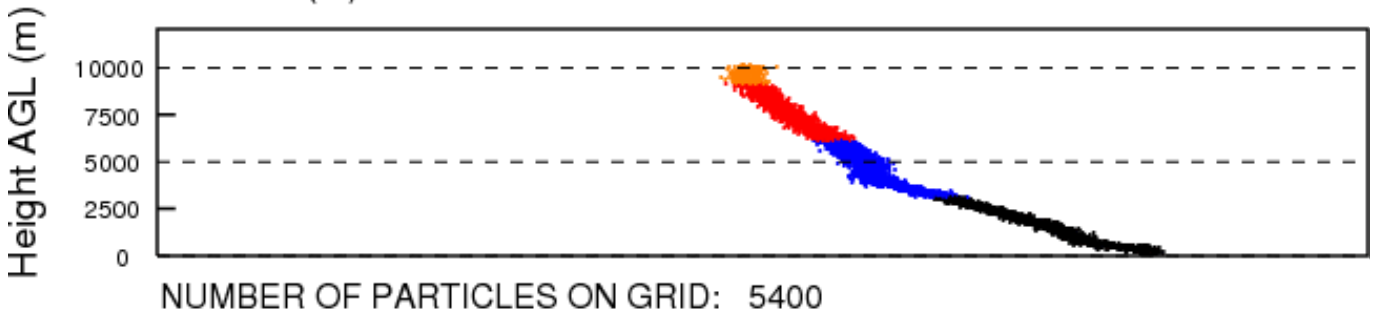
- **Sérfræðingar í öskugreiningu og líkanreikningum vinna að því að samlaga gervitunglagreiningu og dreifilíkan með því að stilla upphafsskilyrðin (e.g. @ NILU)**
- **auðkenning á ösku fjær eldstöðinni borin saman við dreifilíkan virðist setja mjög nýtanlegar skorður á hæð sviföskunnar**
- **Auðvelt og fljótvirkt er að keyra dreifilíkön afturábak frá þeim stað þar sem sést til öskunnar. En þar sem hæðin er óviss þá keyrum aftur háa lóðrétta súlu og skoðum hvaða loftmassar skarast á við eldstöðina.**



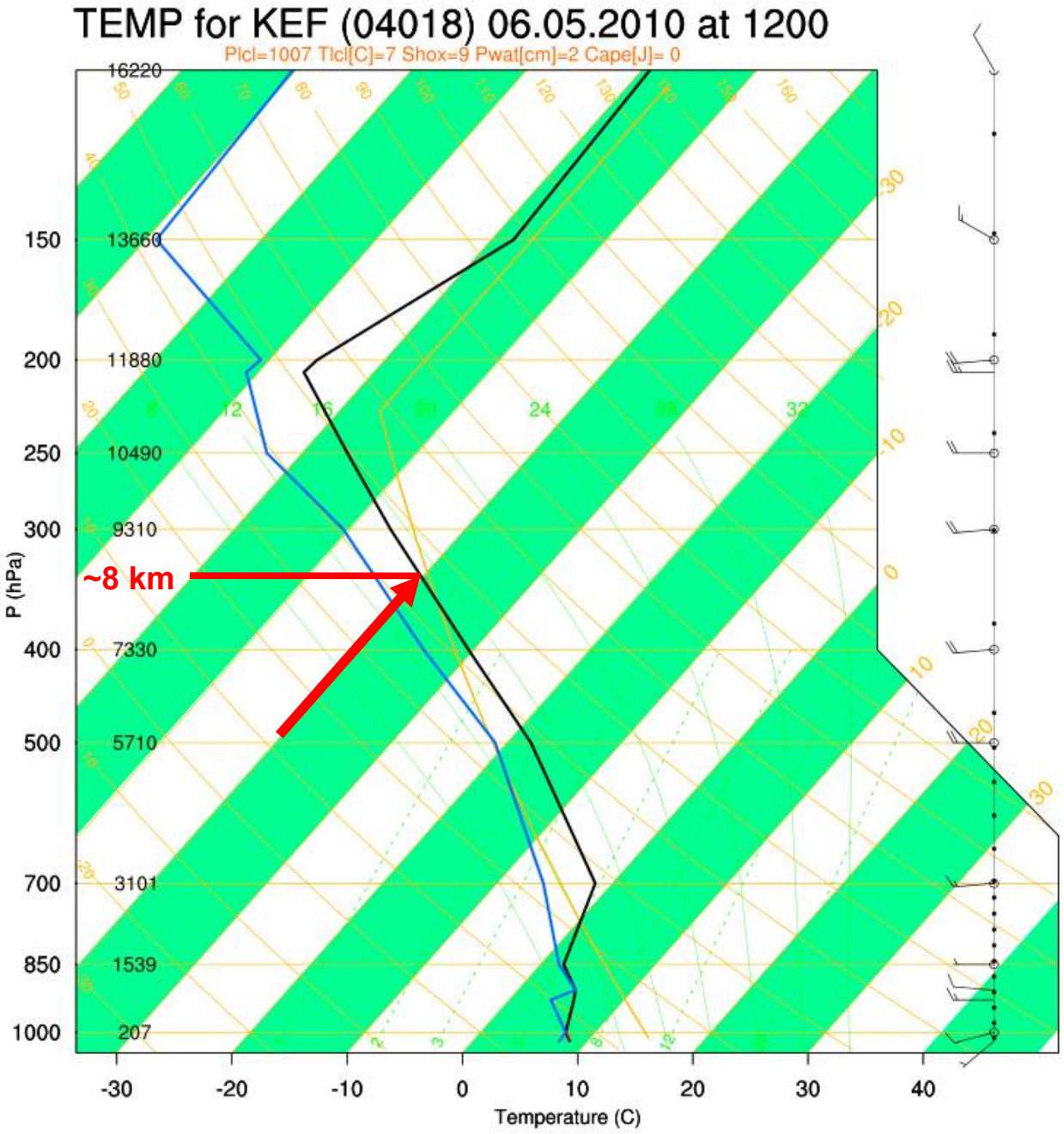
NOAA HYSPLIT MODEL
PARTICLE CROSS-SECTIONS
PARTICLE POSITIONS AT 06 UTC 06 May 10

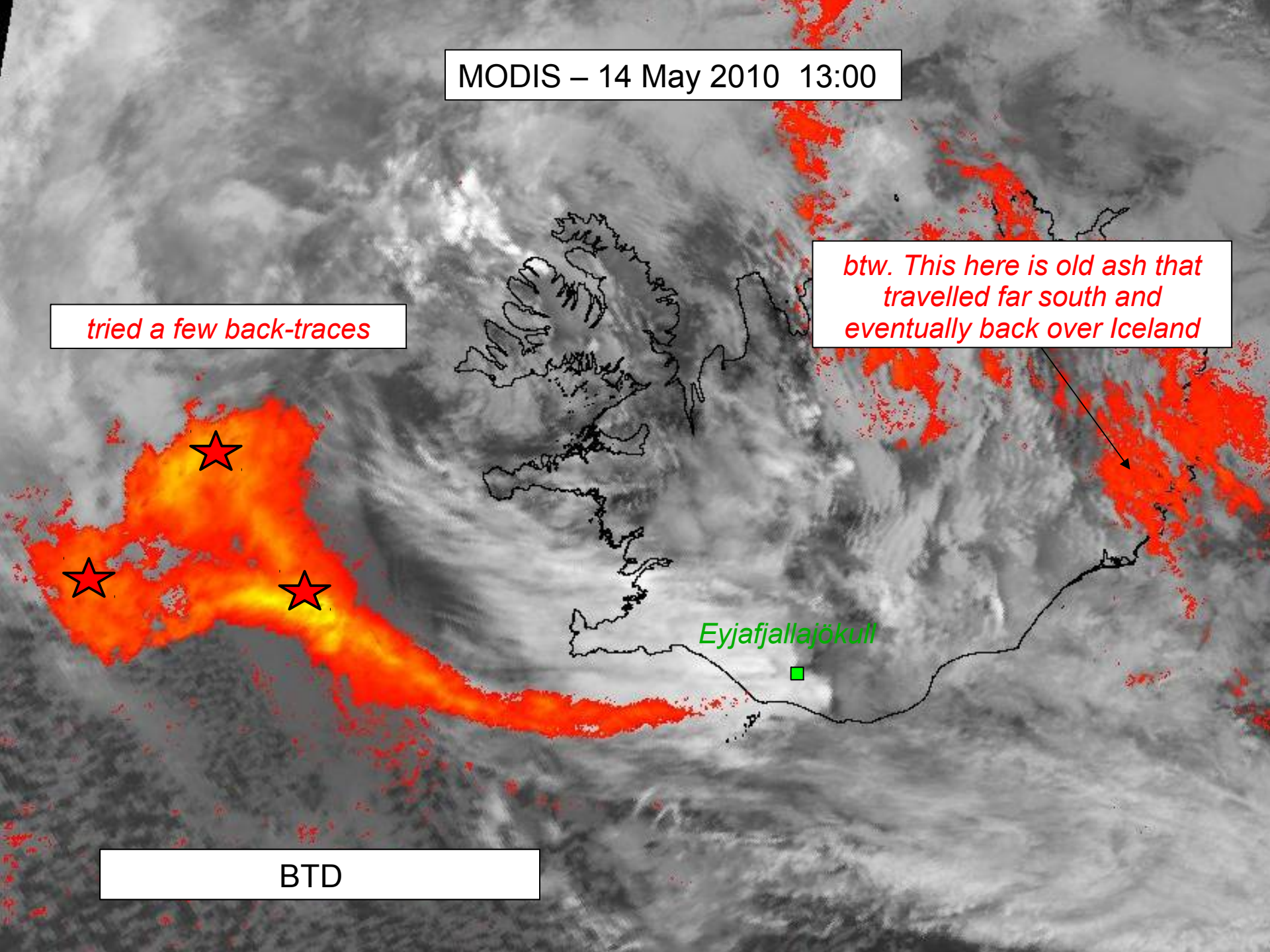


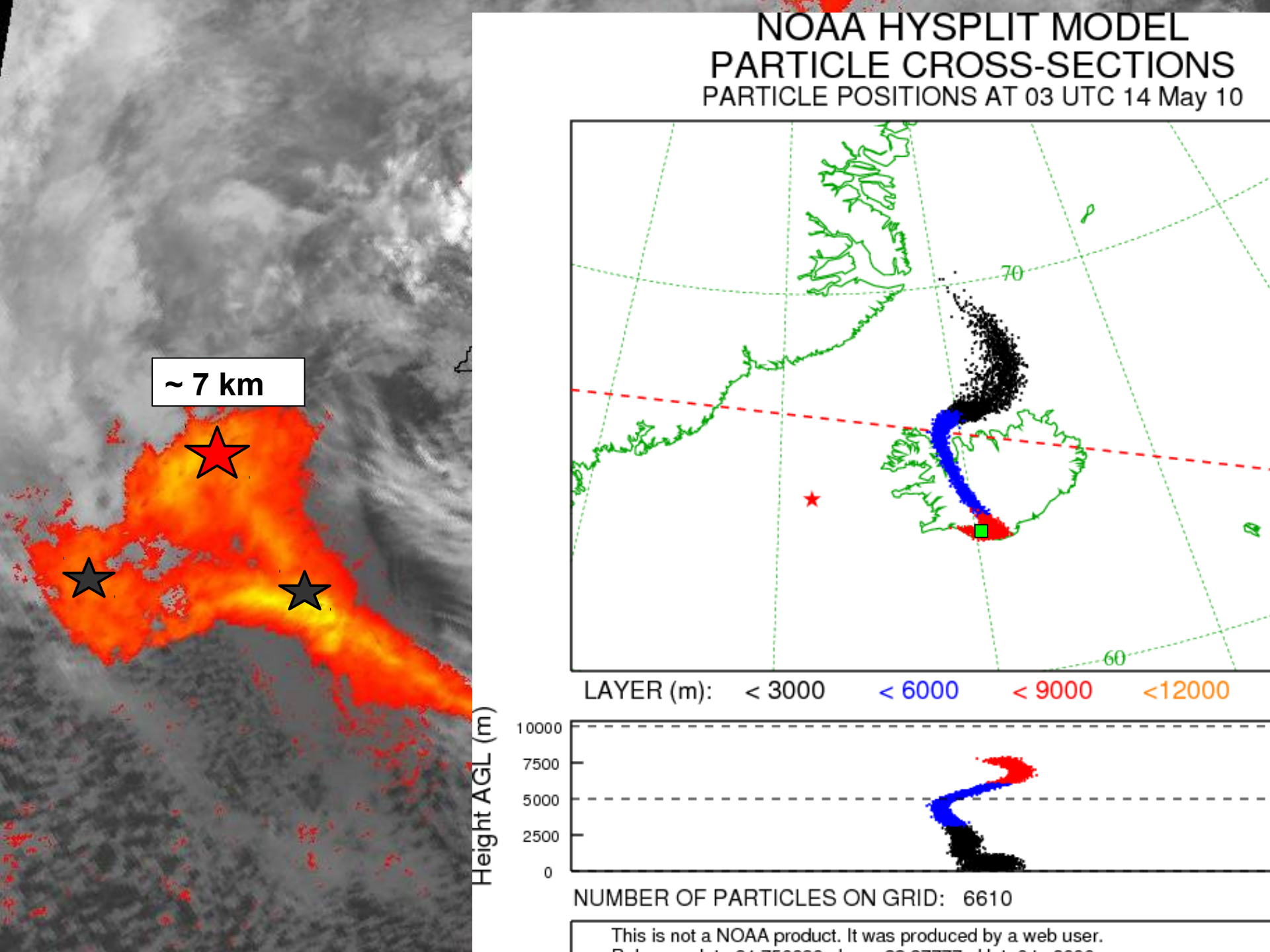
LAYER (m): < 3000 < 6000 < 9000 <12000 <15000

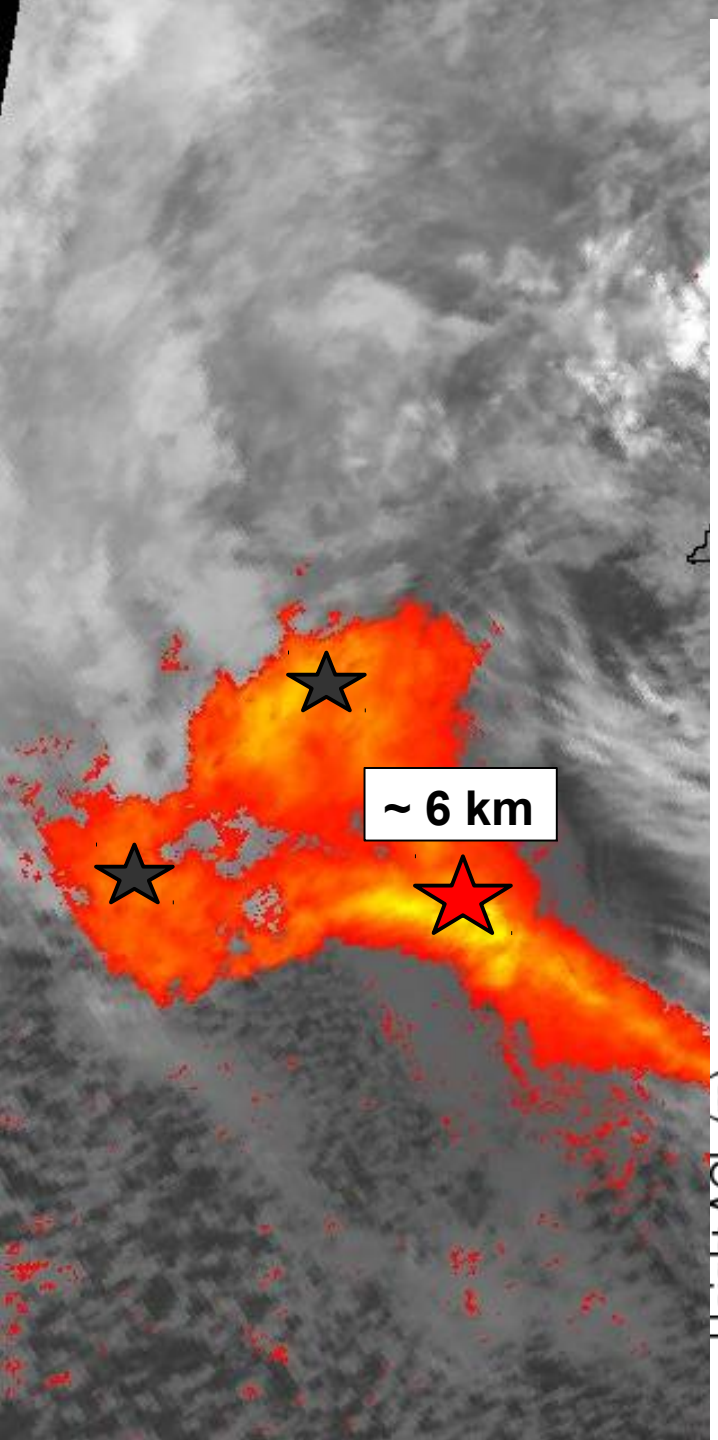


NUMBER OF PARTICLES ON GRID: 5400

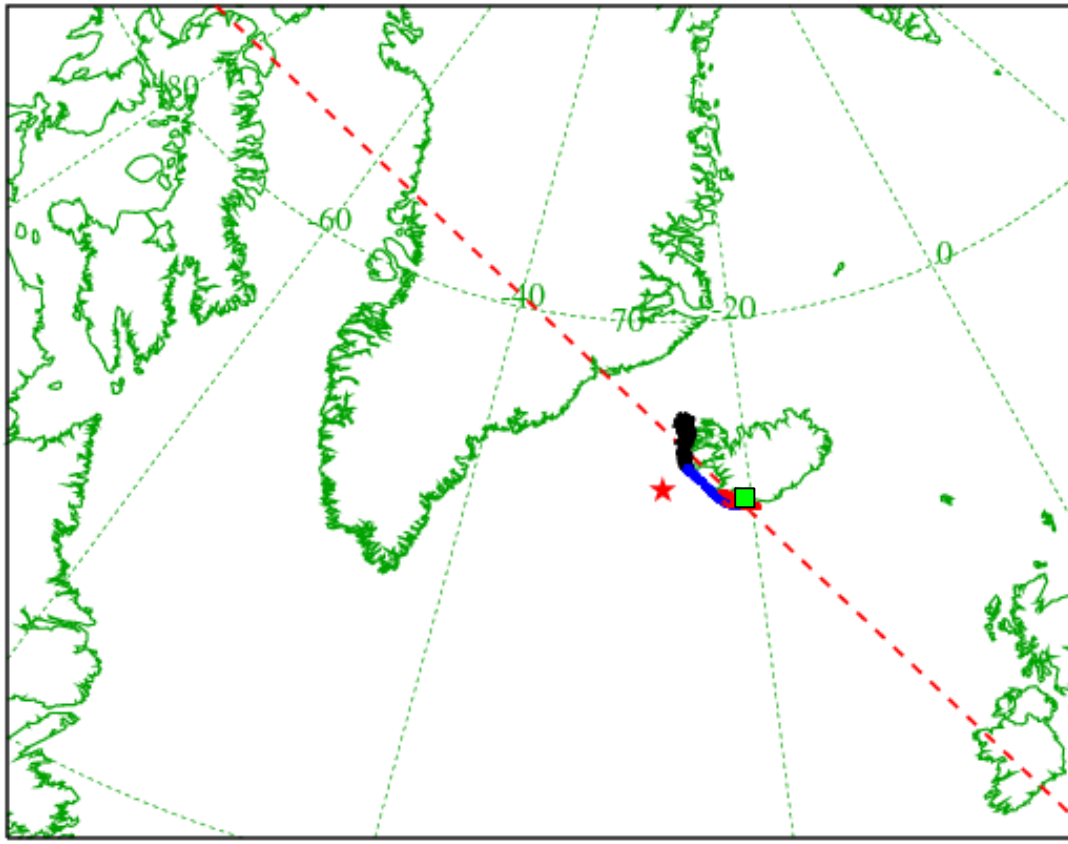

TEMP for KEF (04018) 06.05.2010 at 1200
Plcl=1007 Tlcl[C]=7 Shox=9 Pwat[cm]=2 Cape[J]= 0
16220
13660
11880
10490
9310
7330
5710
3101
1539
207
150
200
250
300
400
500
700
850
1000
P (hPa)
~8 km
-30
-20
-10
0
10
20
30
40
Temperature (C)


MODIS – 14 May 2010 13:00
tried a few back-traces
btw. This here is old ash that travelled far south and eventually back over Iceland
Eyjafjallajökull
BTD

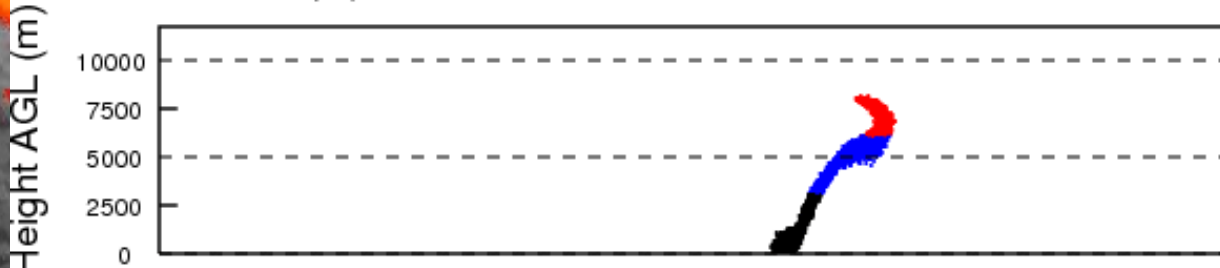

~ 7 km
NOAA HYSPLIT MODEL
PARTICLE CROSS-SECTIONS
PARTICLE POSITIONS AT 03 UTC 14 May 10
70
60
LAYER (m): < 3000 < 6000 < 9000 <12000
Height AGL (m)
10000
7500
5000
2500
0
NUMBER OF PARTICLES ON GRID: 6610
This is not a NOAA product. It was produced by a web user.



NOAA HYSPLIT MODEL
PARTICLE CROSS-SECTIONS
PARTICLE POSITIONS AT 07 UTC 14 May 10

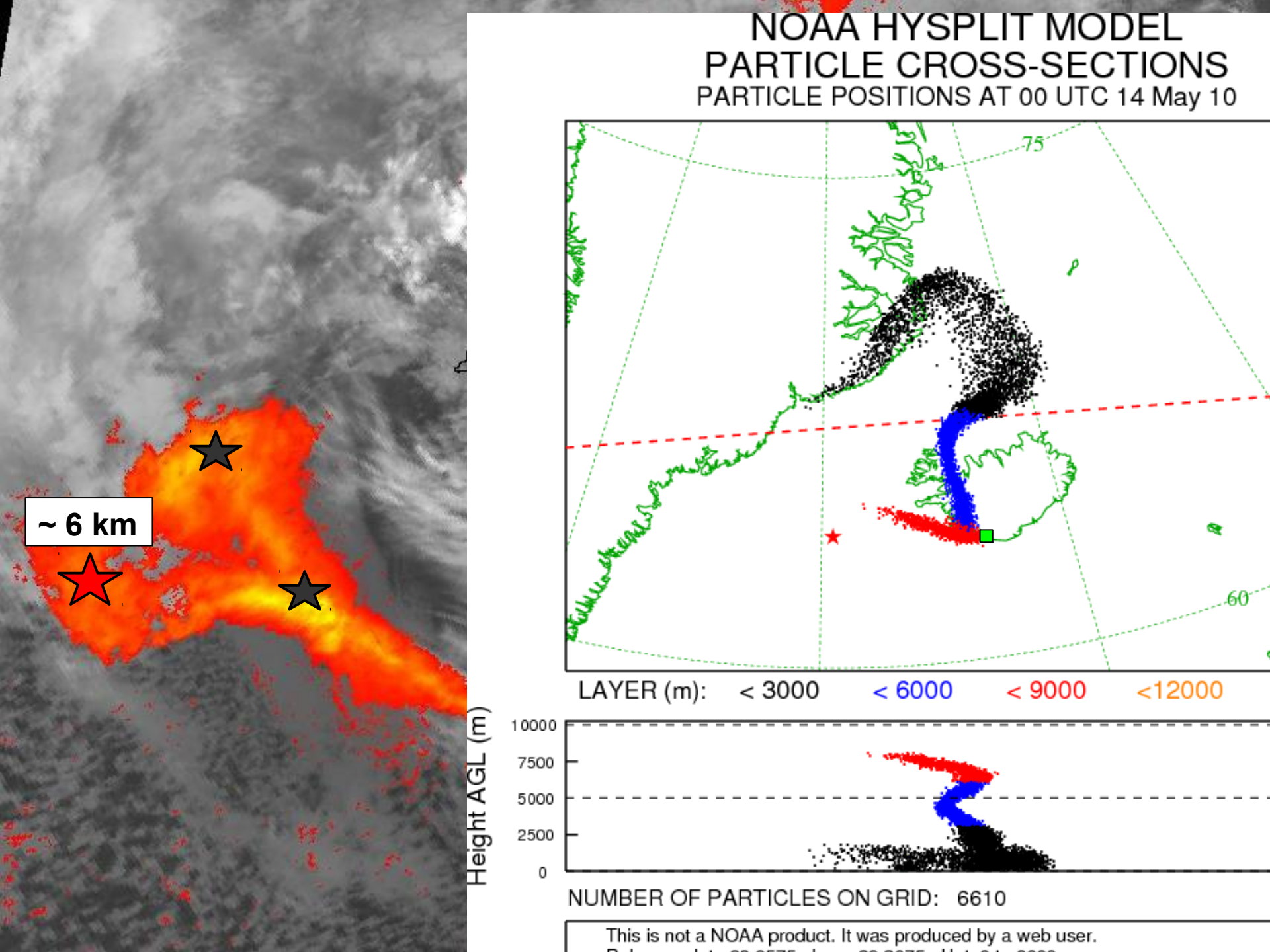


LAYER (m): < 3000 < 6000 < 9000 <12000



NUMBER OF PARTICLES ON GRID: 7810

This is not a NOAA product. It was produced by a web user.


~ 6 km
NOAA HYSPLIT MODEL
PARTICLE CROSS-SECTIONS
PARTICLE POSITIONS AT 00 UTC 14 May 10
75
60
LAYER (m): < 3000 < 6000 < 9000 <12000
Height AGL (m)
10000
7500
5000
2500
0
NUMBER OF PARTICLES ON GRID: 6610
This is not a NOAA product. It was produced by a web user.

Gagnlegt rauntíma-tól til frekari greiningar á öskumyndum

- **Með tiltölulega einföldum hugbúnaði getur vakthafandi veðurfræðingur smellt á svæði þar sem sést til gosösku og sjálfkrafa fer í gang dreifilíkan (NAME/Hysplit?) sem byggir upp líklega mynd af öskuhæð.**
- **Einnig er sjálfsagt er að reyna að gera slíka greiningu sjálfvirka að einhverju leiti.**

Final dispersion modelling question...

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- **Weather models with integrated aerosol dispersion**
  - can ash identification constrain meteorolocial parameters as well as dispersion parameters?
  - what is the outlook?
- **HIRLAM / HARMONIE has a powerful radiative transfer algorithm (RTTOV), capable of Mie scattering**
  - quantitative ash retrieval within the model taking account of obvious constraints such as source location?

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