



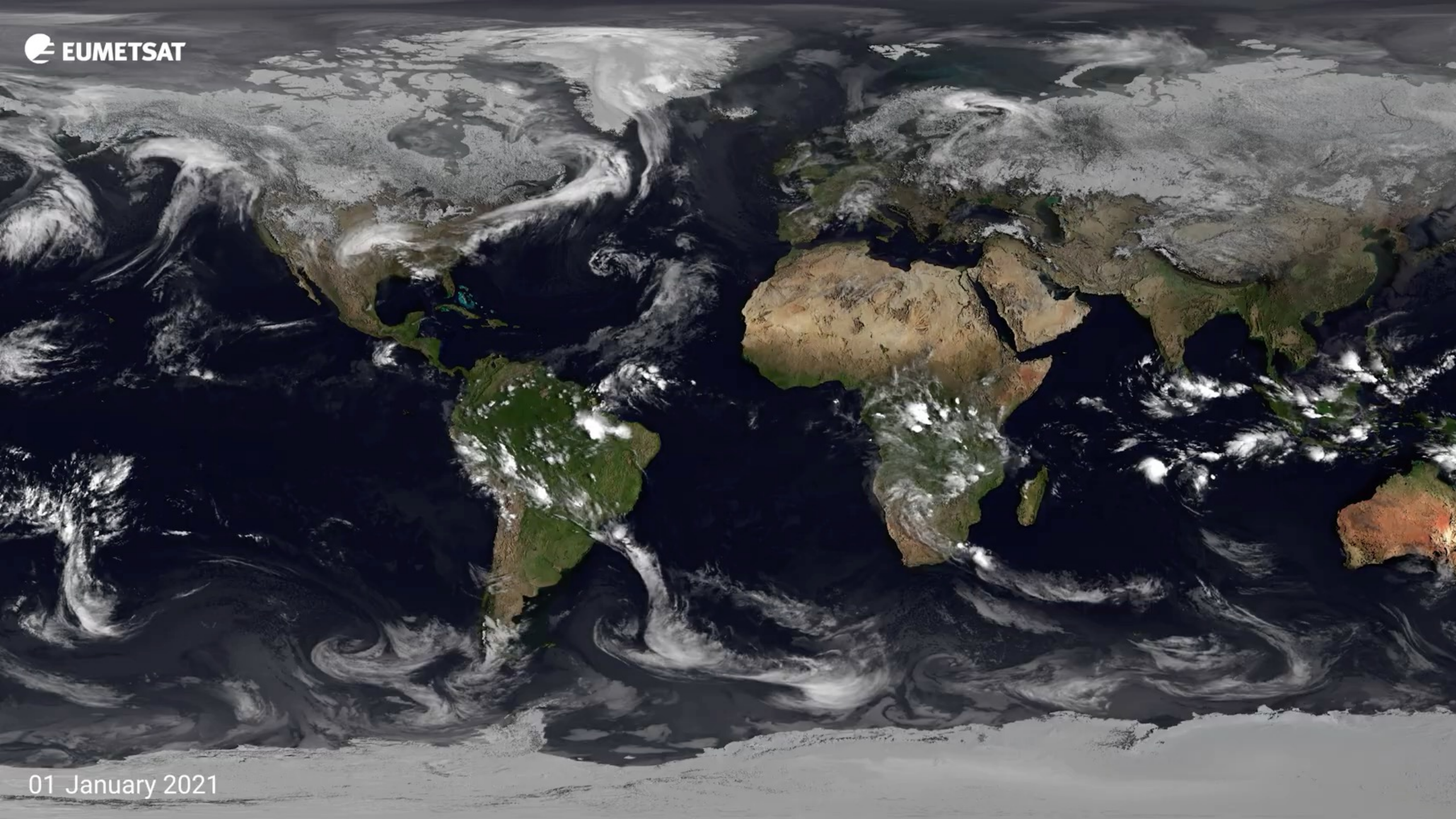
De stille revolutie

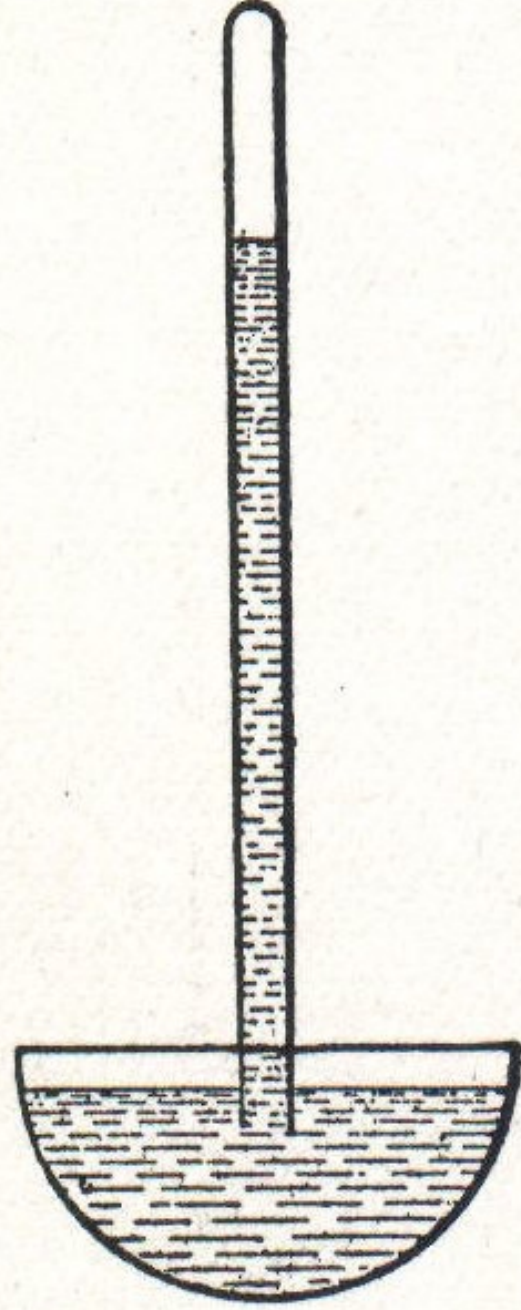
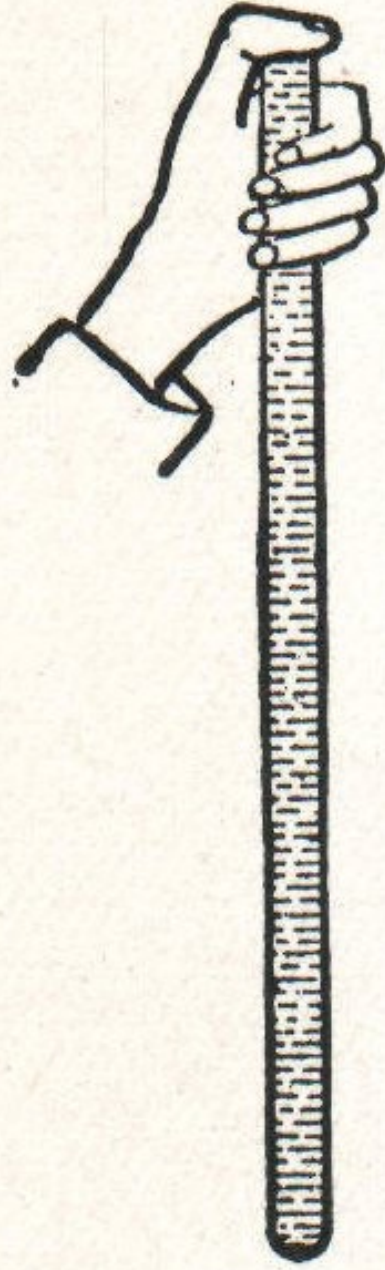
de opkomst van weermodellen

Peter Kuipers Munneke

WND Conferentie
15 december 2023















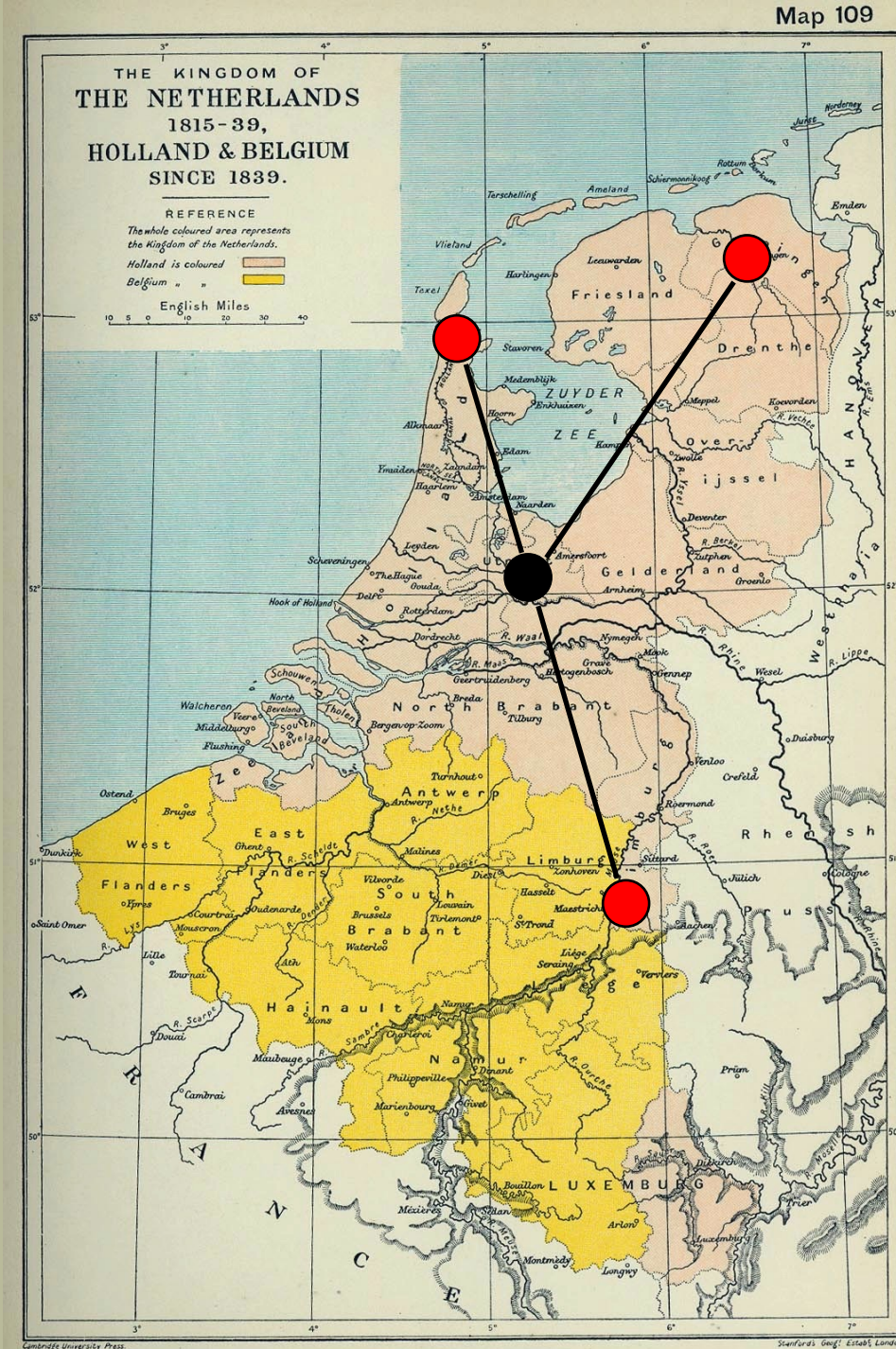
Chr. Schüder del.

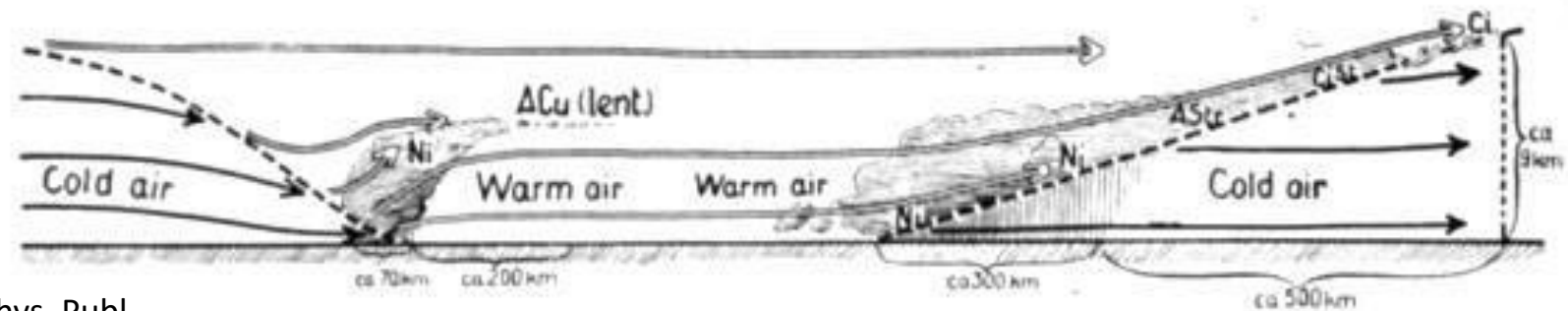
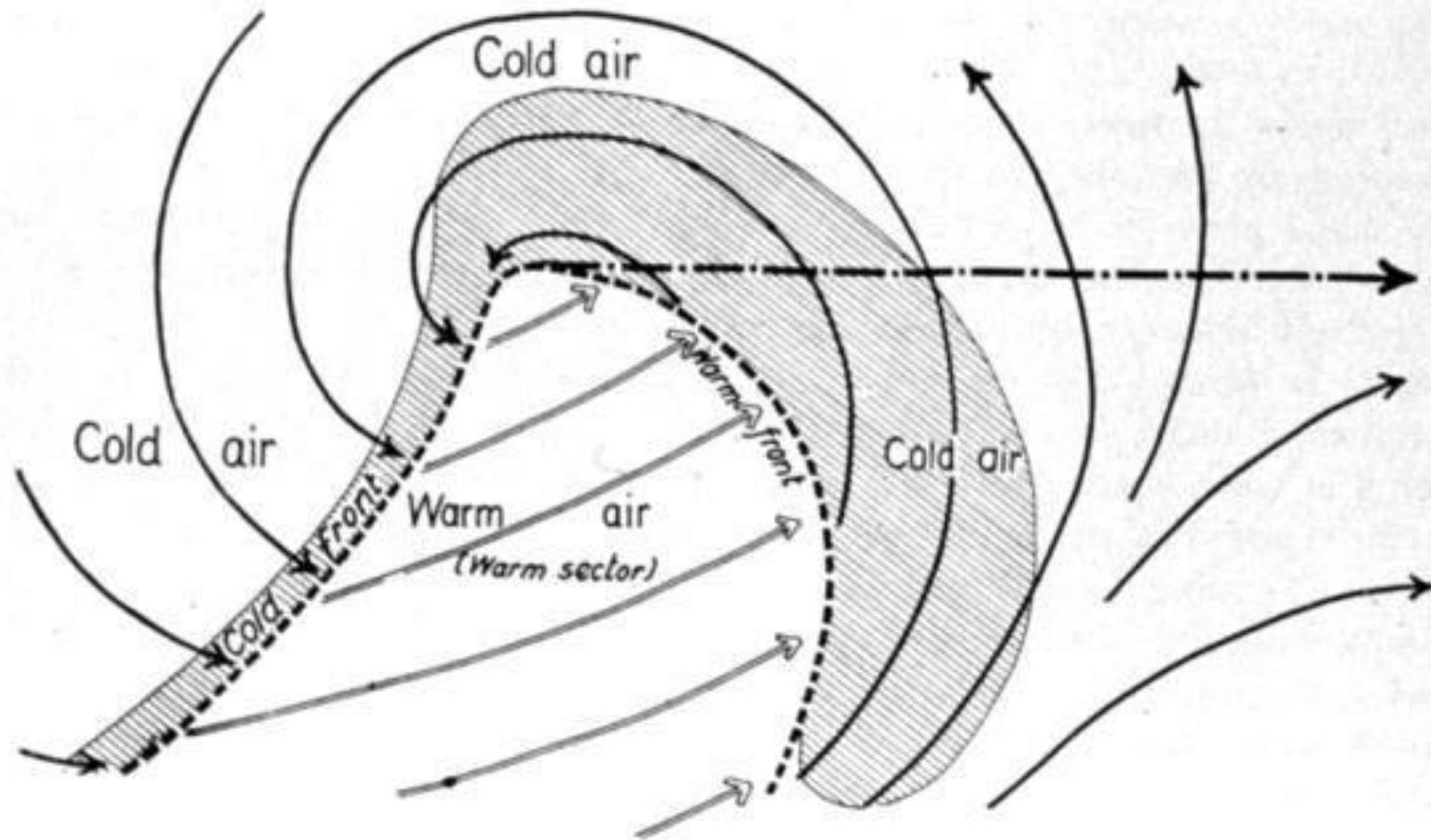
Exec. bij. G. G. Lange, Darmstadt.

G. M. Kurz sculpt.

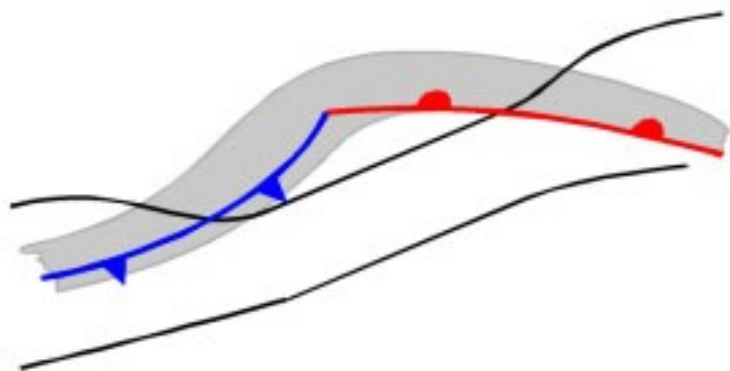
ZALT-BOMMEL.

“De rigting was of werd dan steeds Oostelijk (tusschen N.O. en Z.O.), als de stand hooger was te Groningen en te Helder dan te Maastricht, en steeds West of Zuidwest, als hij hooger was te Maastricht dan te Helder, bijna zonder uitzondering.”

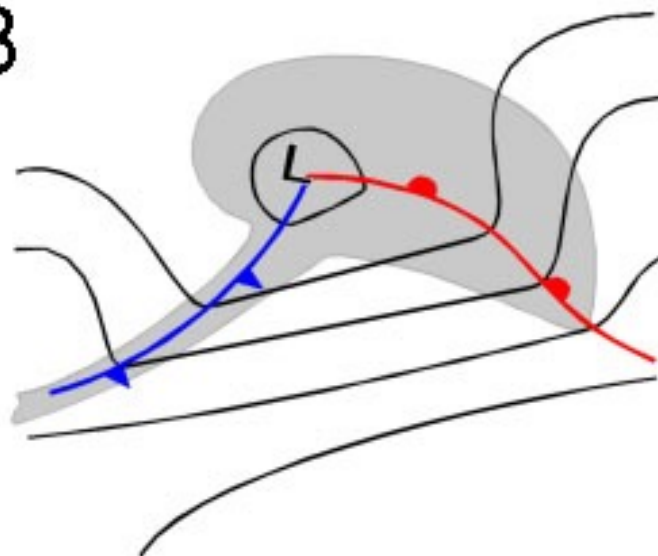




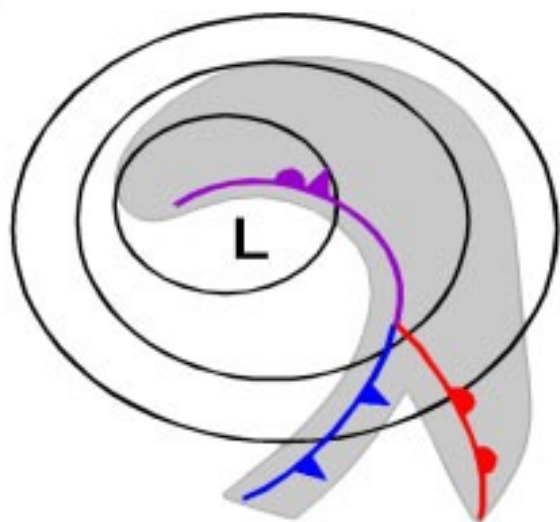
A



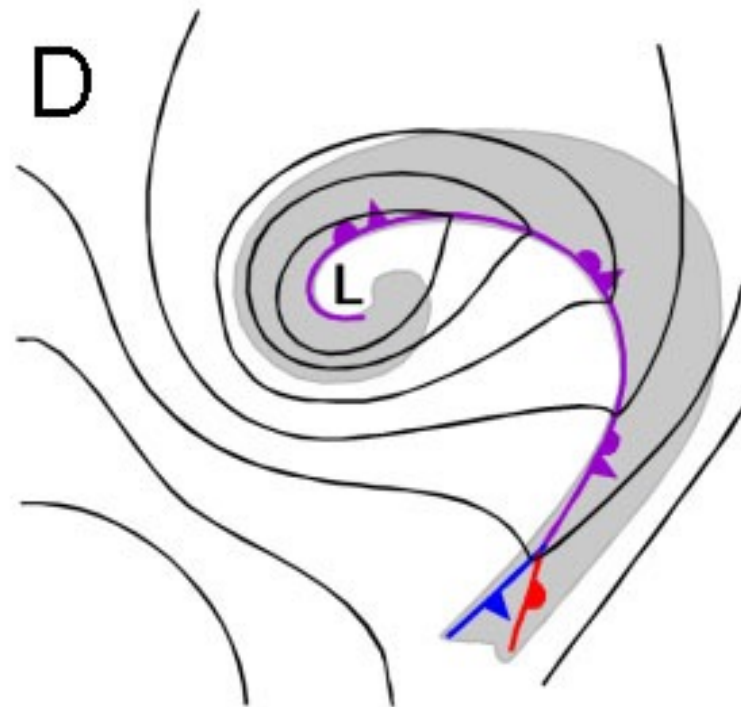
B



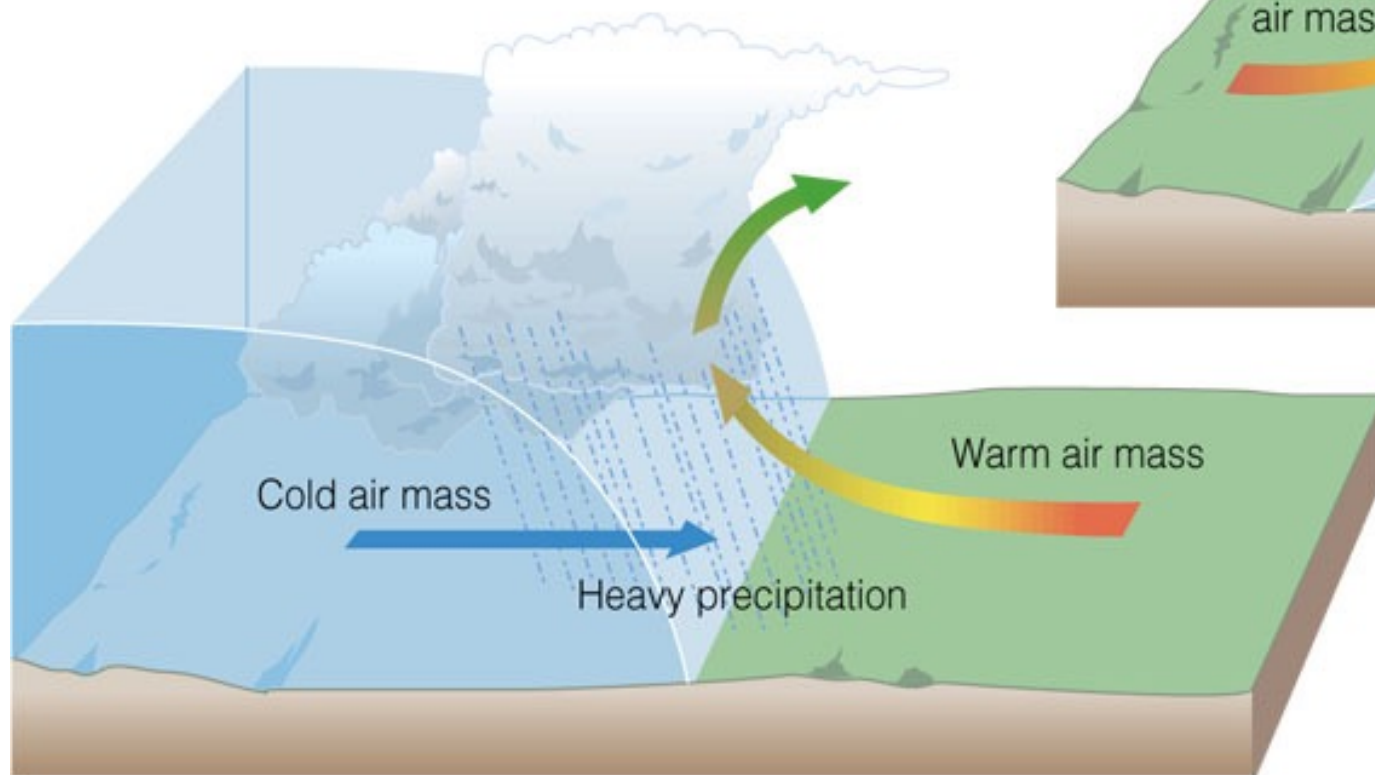
C



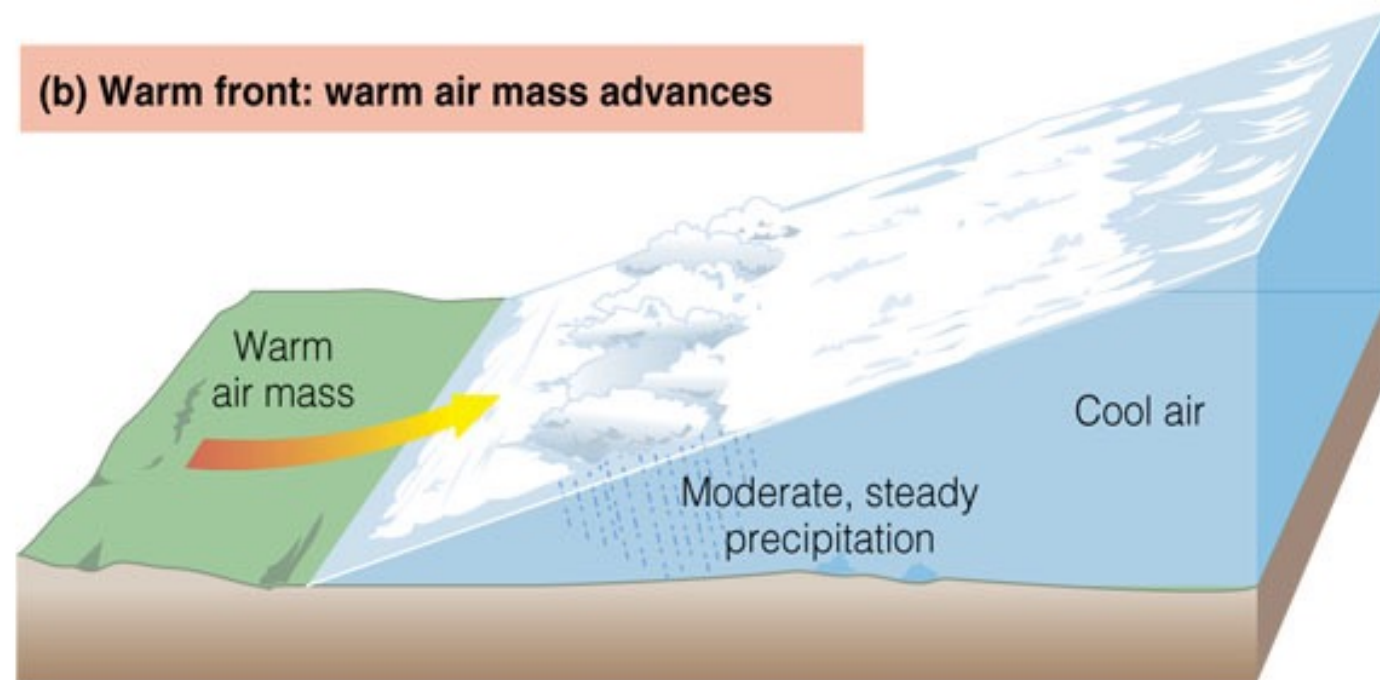
D

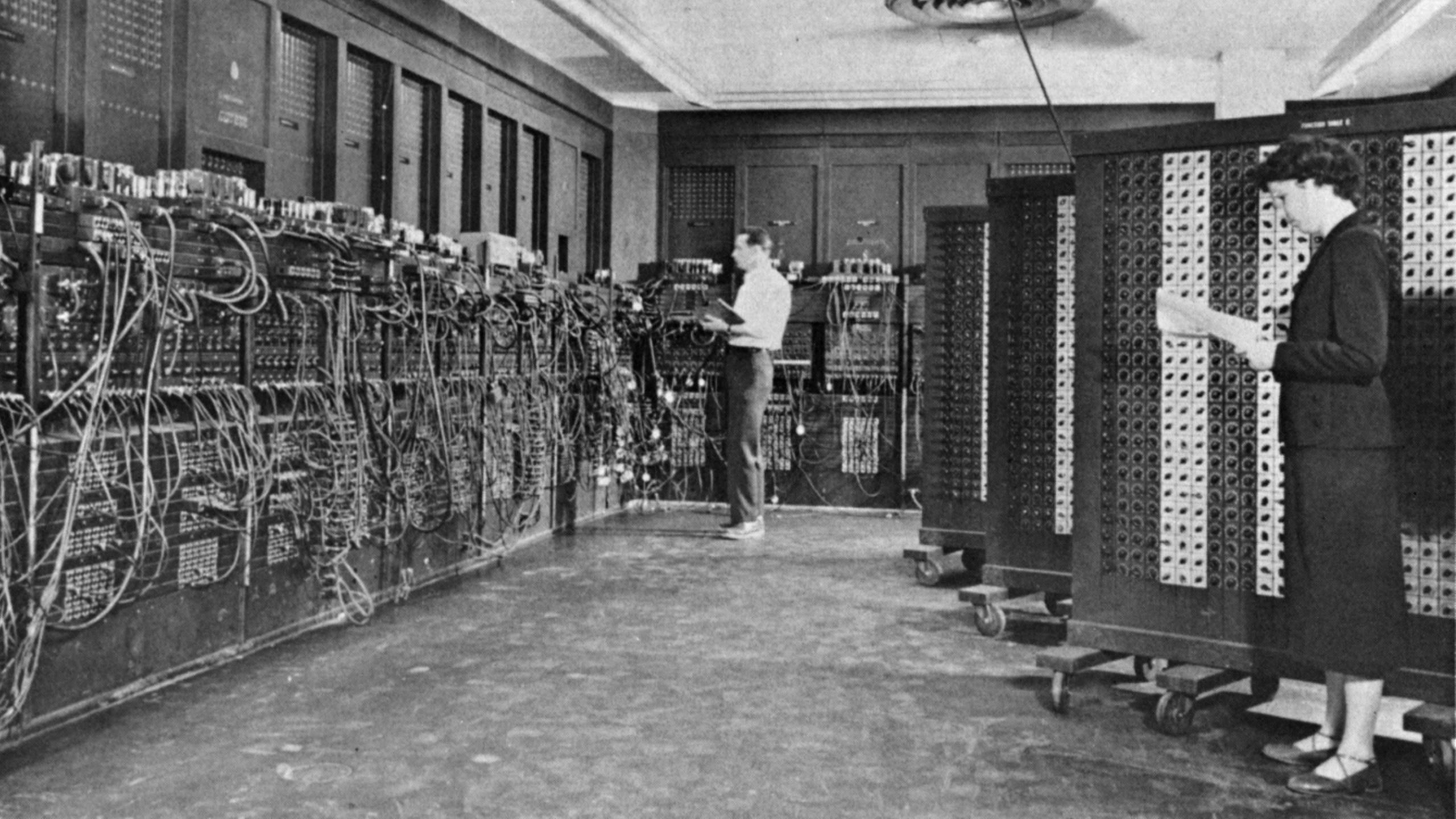


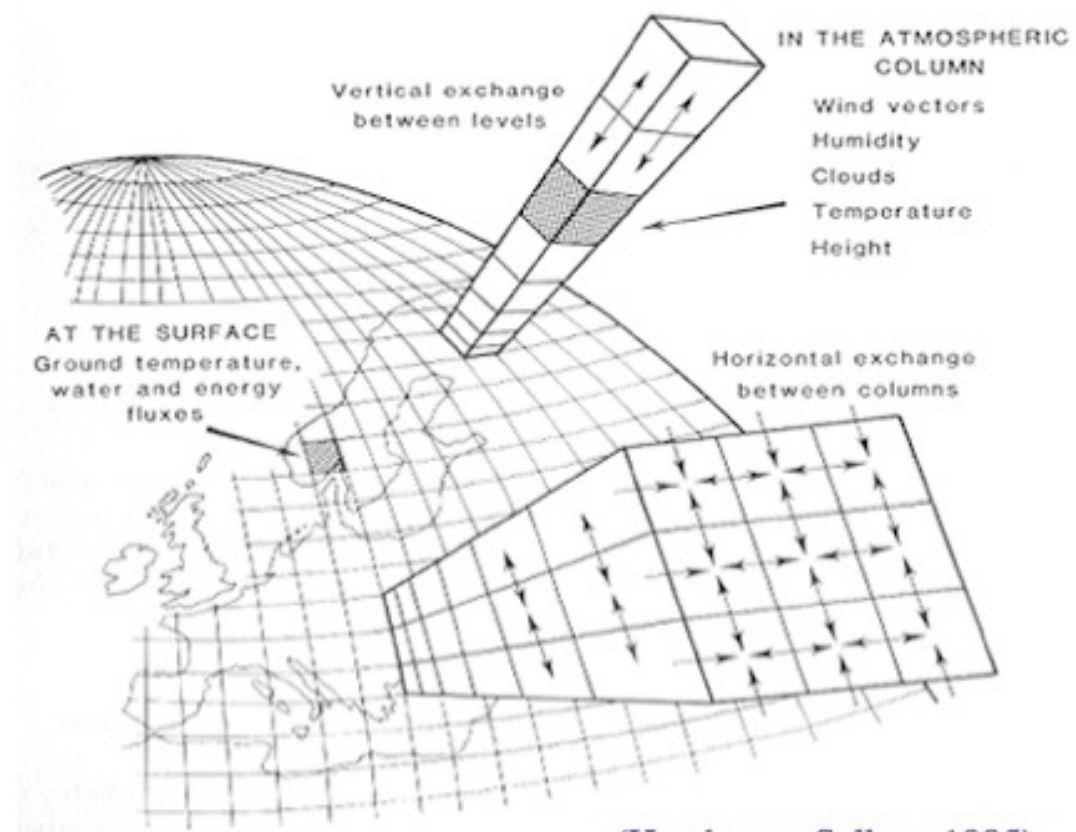
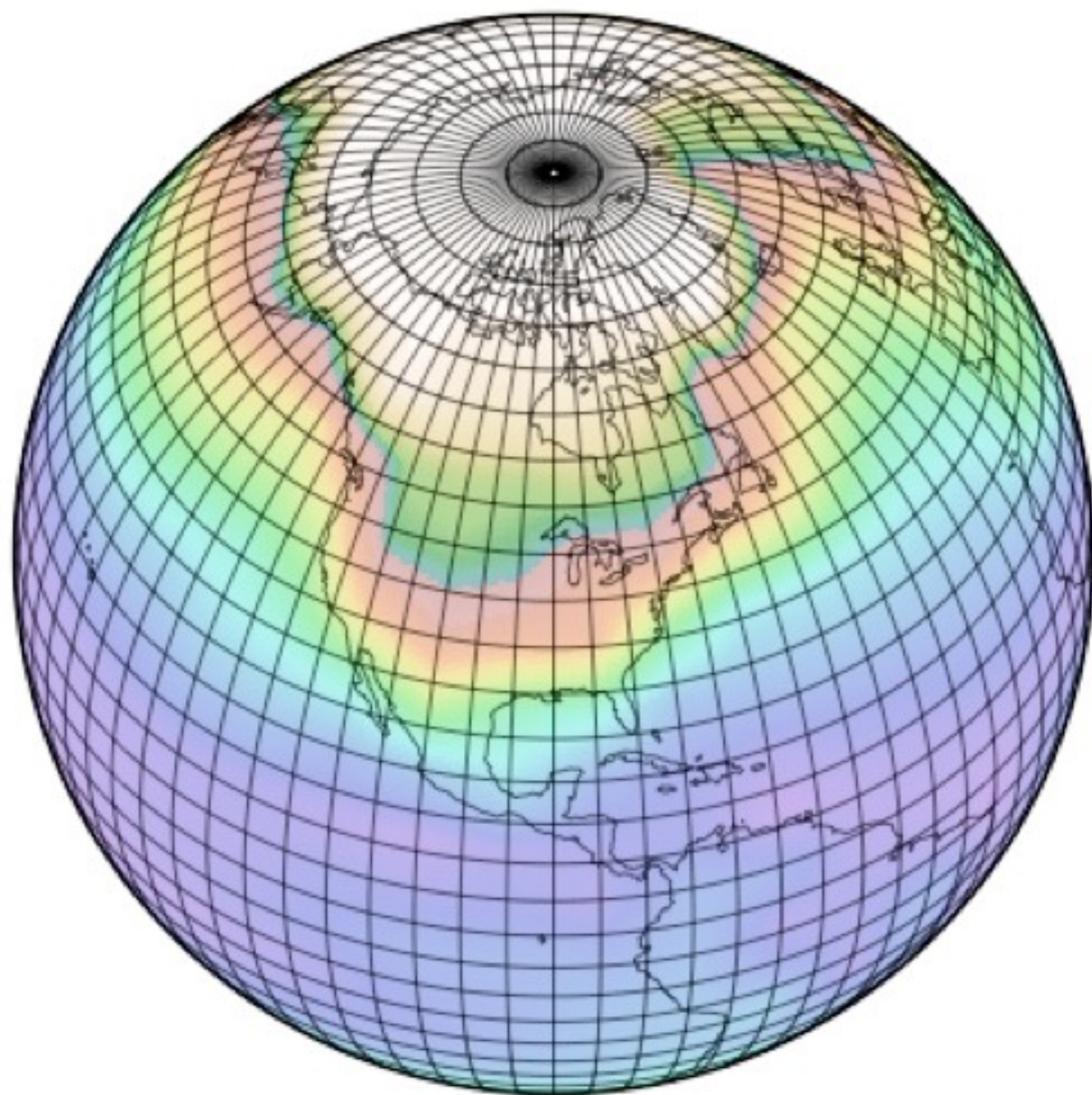
(a) Cold front: cold air mass advances



(b) Warm front: warm air mass advances







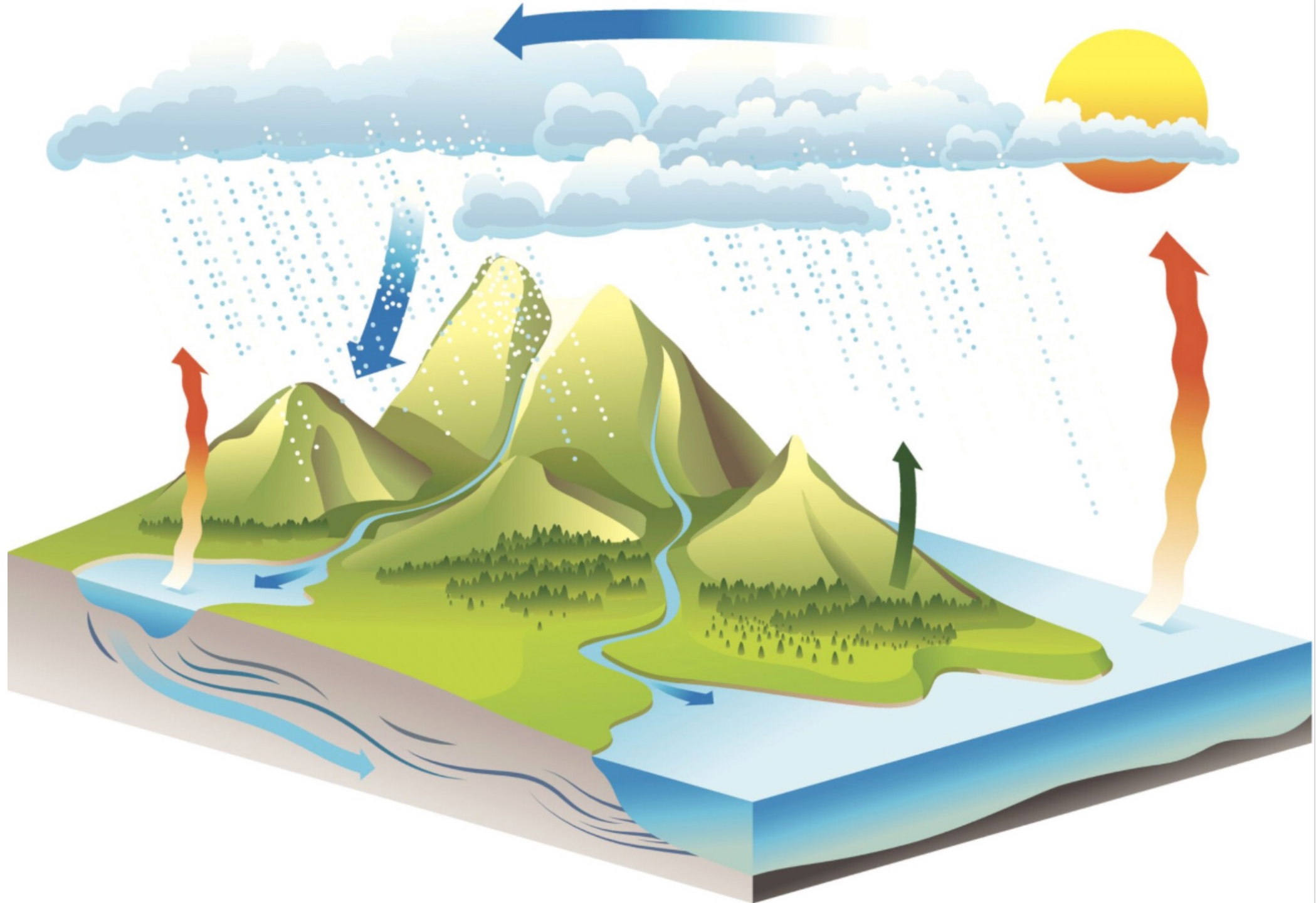
(Henderson-Sellers, 1985)



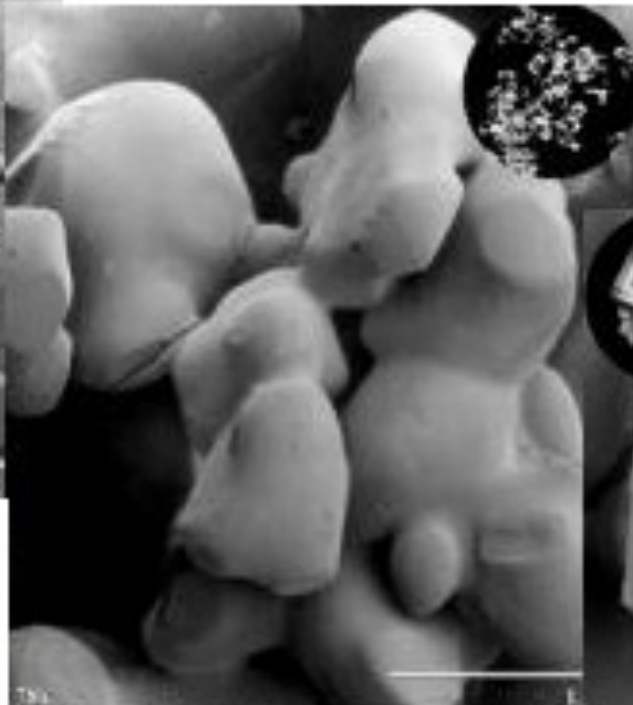
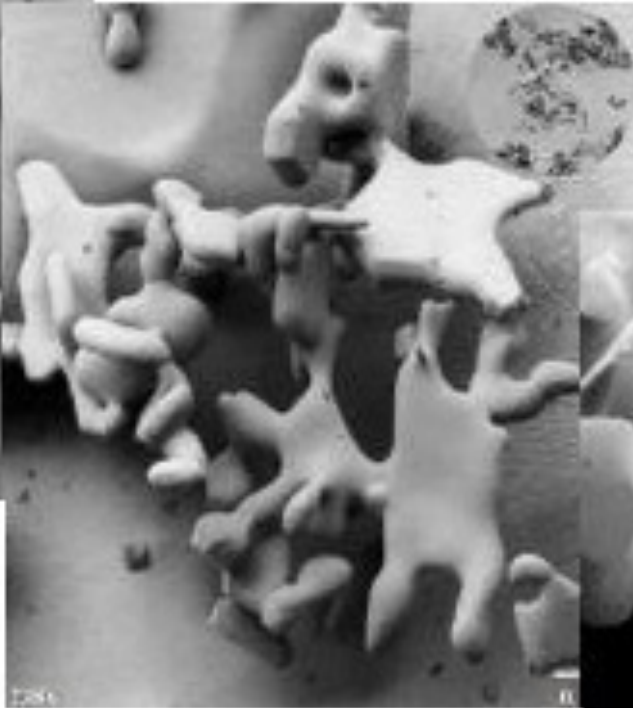








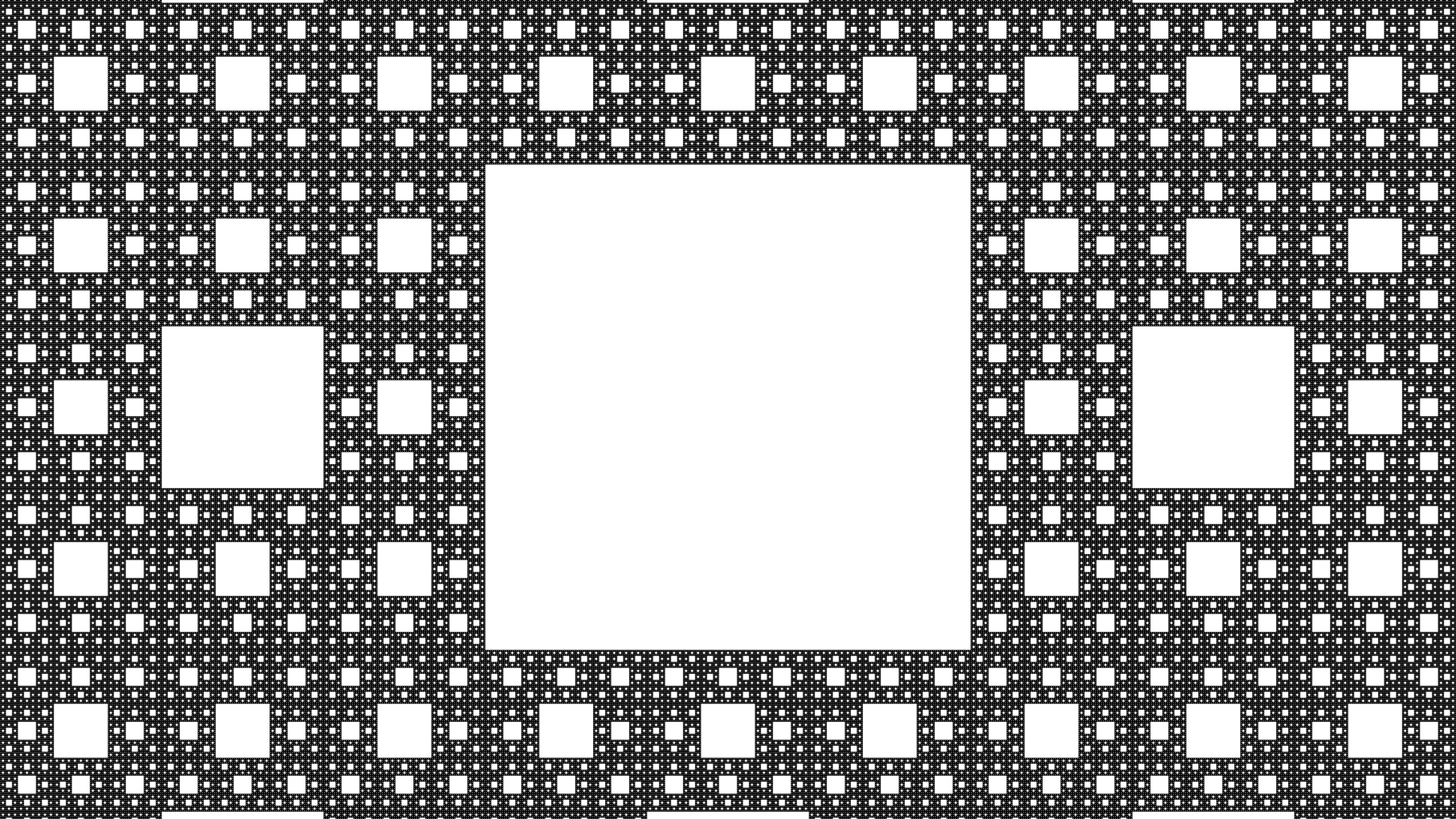




$$\hat{\mathbf{n}}^{\text{inc}} \cdot \nabla \mathbf{l}_c(\mathbf{r}) = -n_0 \langle \mathbf{K}(\hat{\mathbf{n}}^{\text{inc}}) \rangle_{\xi} \mathbf{l}_c(\mathbf{r}),$$

$$\begin{aligned} \hat{\mathbf{q}} \cdot \nabla \tilde{\mathbf{l}}_d(\mathbf{r}, \hat{\mathbf{q}}) = & -n_0 \langle \mathbf{K}(\hat{\mathbf{q}}) \rangle_{\xi} \tilde{\mathbf{l}}_d(\mathbf{r}, \hat{\mathbf{q}}) \\ & + n_0 \int_{4\pi} d\hat{\mathbf{q}}' \langle \mathbf{Z}(\hat{\mathbf{q}}, \hat{\mathbf{q}}') \rangle_{\xi} \tilde{\mathbf{l}}_d(\mathbf{r}, \hat{\mathbf{q}}') \\ & + n_0 \langle \mathbf{Z}(\hat{\mathbf{q}}, \hat{\mathbf{n}}^{\text{inc}}) \rangle_{\xi} \mathbf{l}_c(\mathbf{r}). \end{aligned}$$

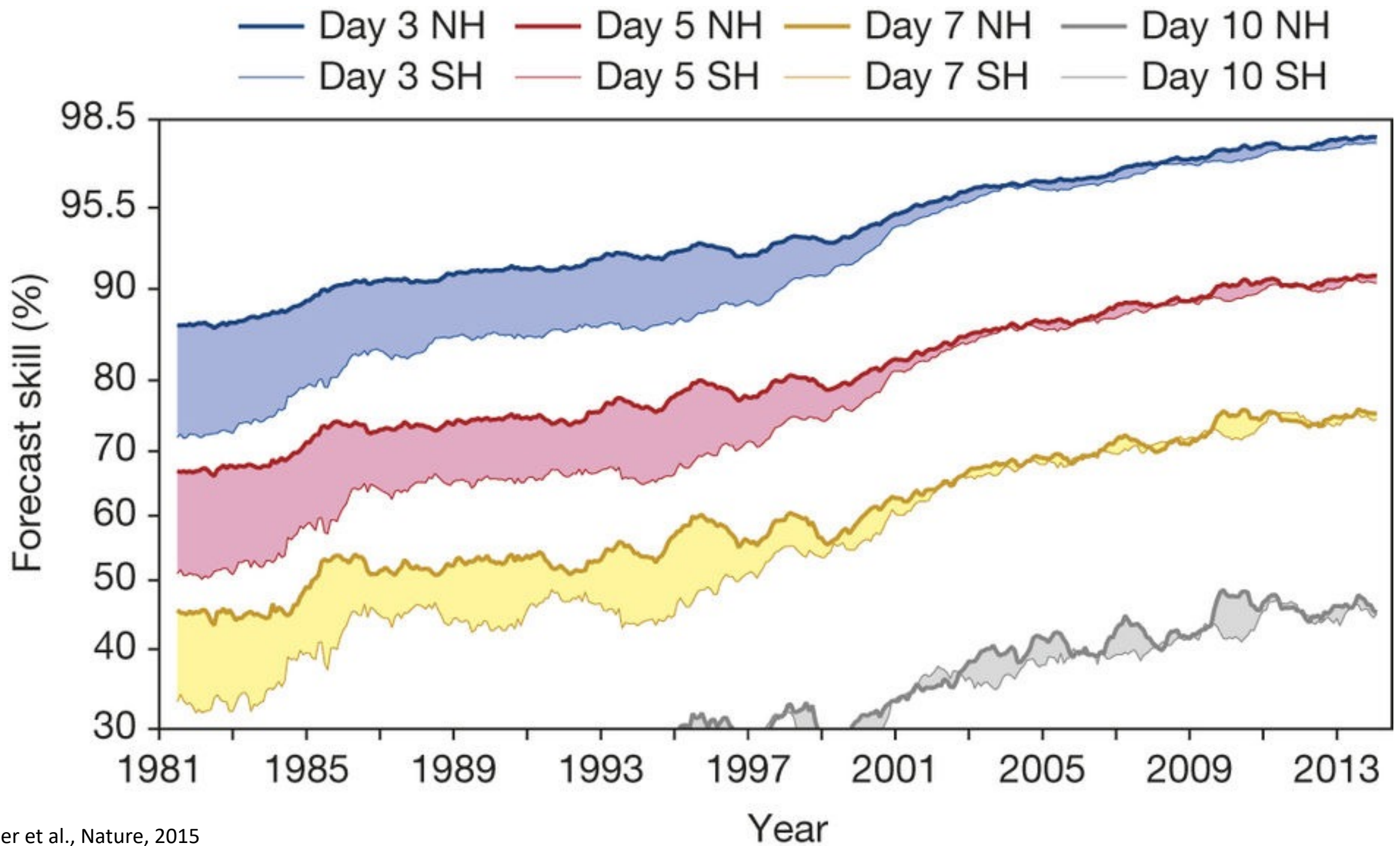
$$\frac{dm}{dT} = \frac{4\pi r \frac{p_{amb} - p_s(r, T)}{p_{eq}}}{\left(\frac{L}{R_v T} - 1 \right) \frac{L}{KT} + \frac{R_v T}{p_{eq} D_v}}$$

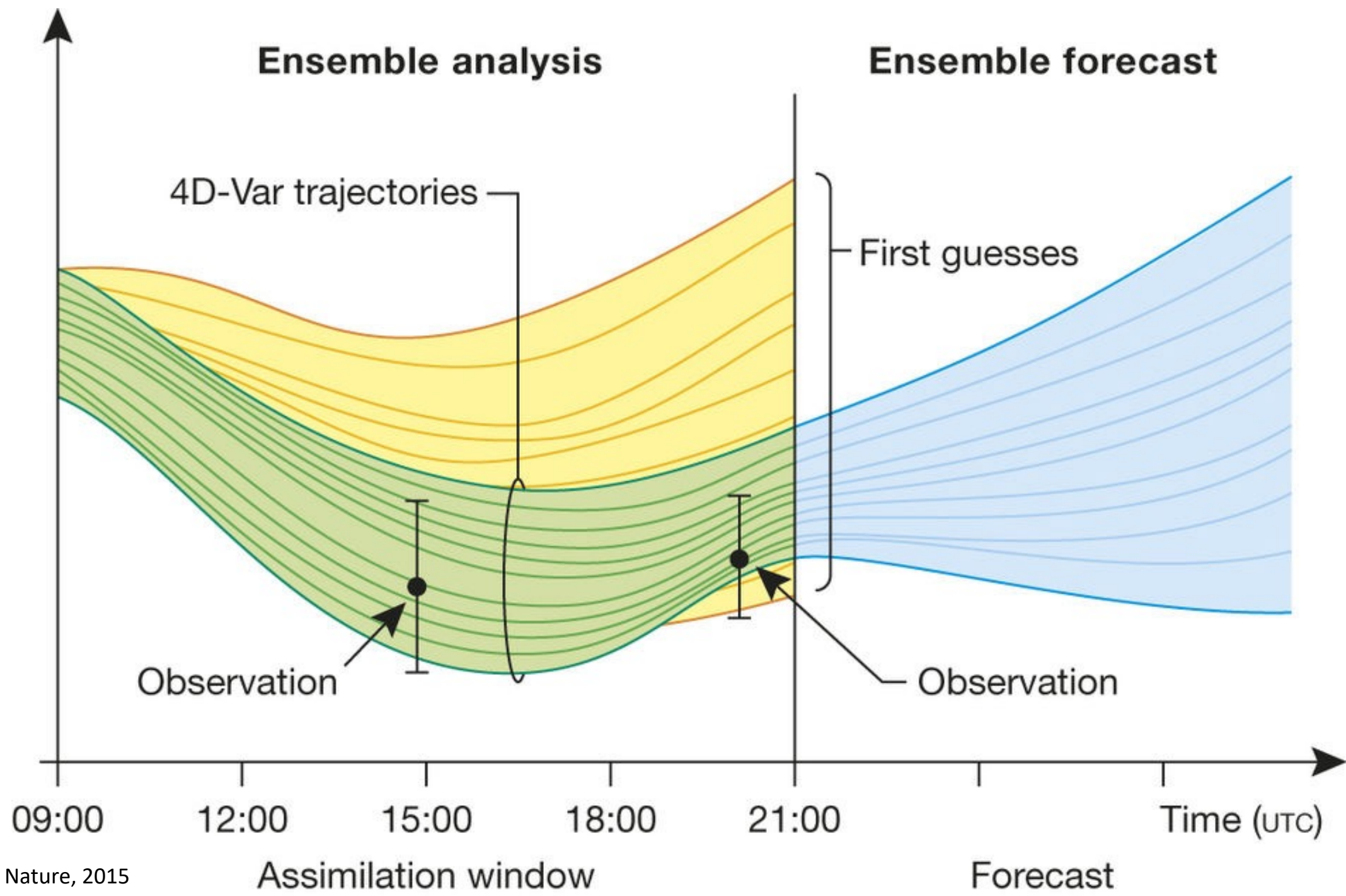






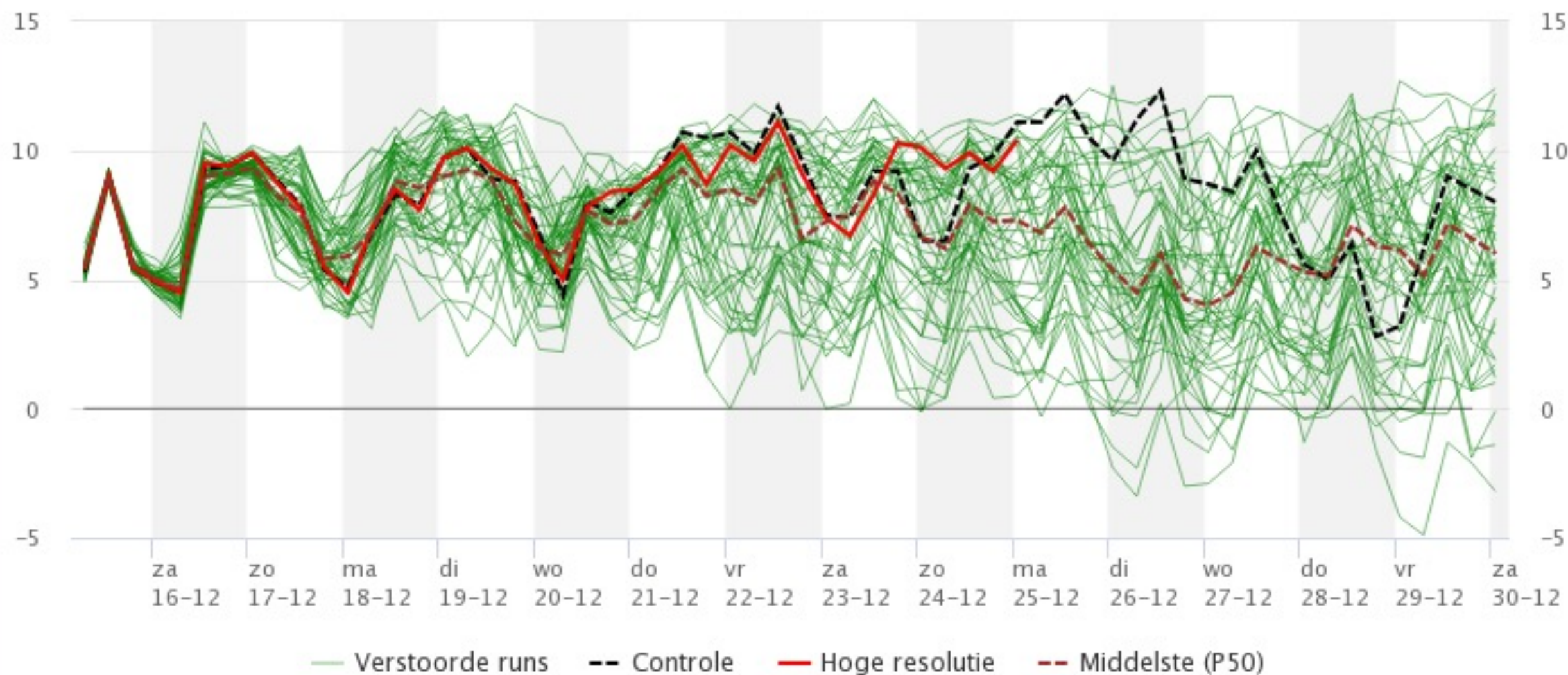






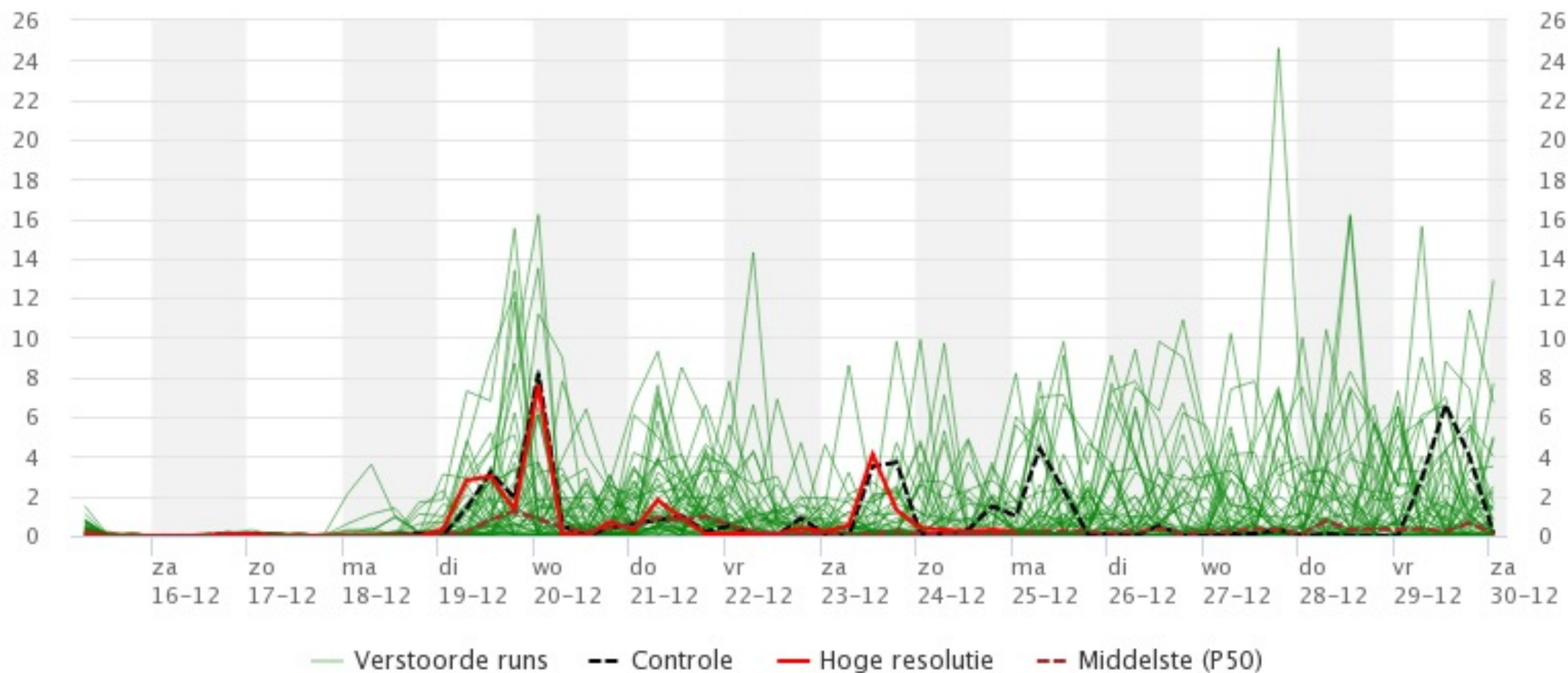
Temperatuur (°C)

De Bilt, vrijdag 15 december 2023 (Versie vr 00 uur)



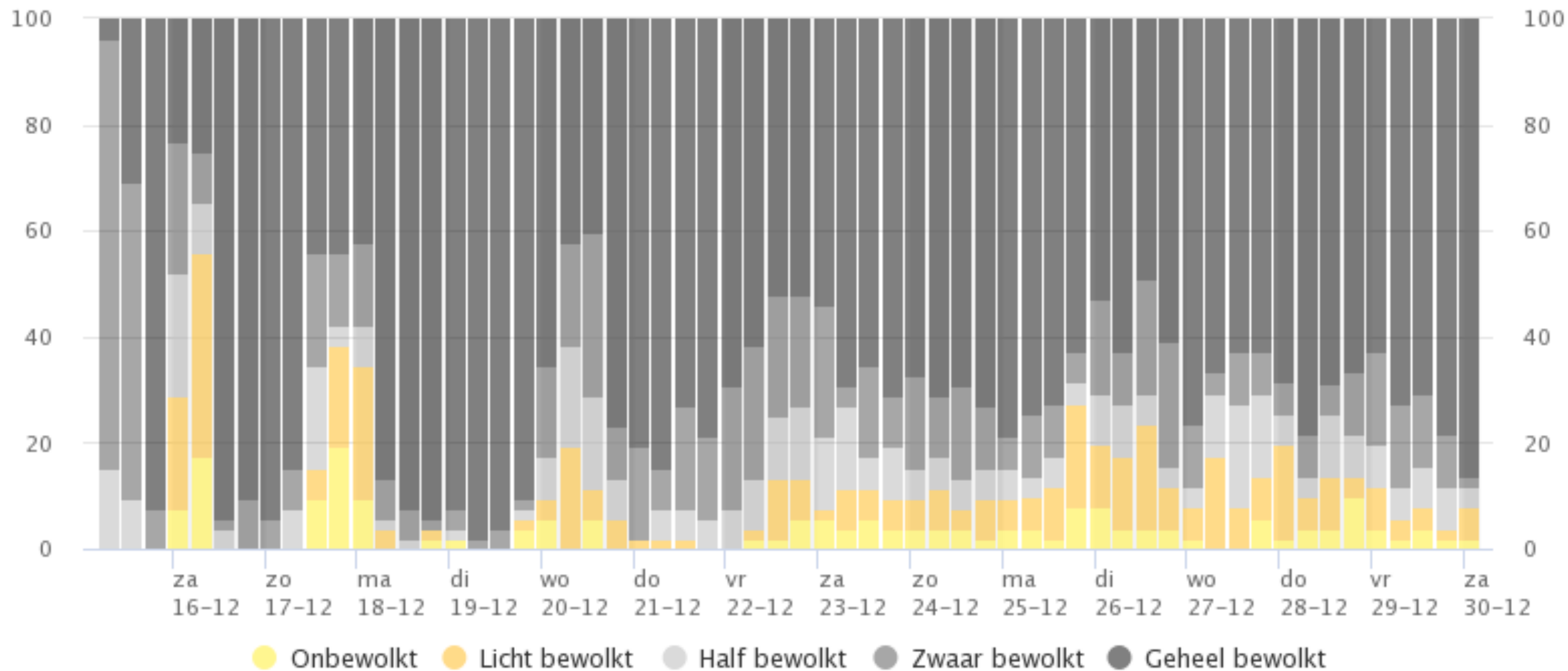
Neerslag (mm, 6 uurlijks)

De Bilt, vrijdag 15 december 2023 (Versie vr 00 uur)



Bewolking (%)

De Bilt, vrijdag 15 december 2023 (Versie vr 00 uur)



NOS

VRIJDAG

ZATERDAG

ZONDAG

MAANDAG



GEMIDDELD

MIN 1

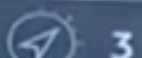
MAX 7



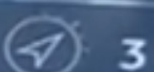
3 9



5 8



6 10



NOS



MORGEN

npo

bewolkt en
minder zacht

DAARNA

zacht en droog

[illegible]

London, Published January 1. 1800, by R. Wilson N^o 58 Cornhill.



De stille revolutie

de opkomst van weermodellen

Peter Kuipers Munneke

WND Conferentie
15 december 2023