UNIVERSITY OF BERGEN
Geophysical Institute

gLidar

Probing atmospheric convection in complex terrain

using Lidar, Paraglider, and (Sail)planes

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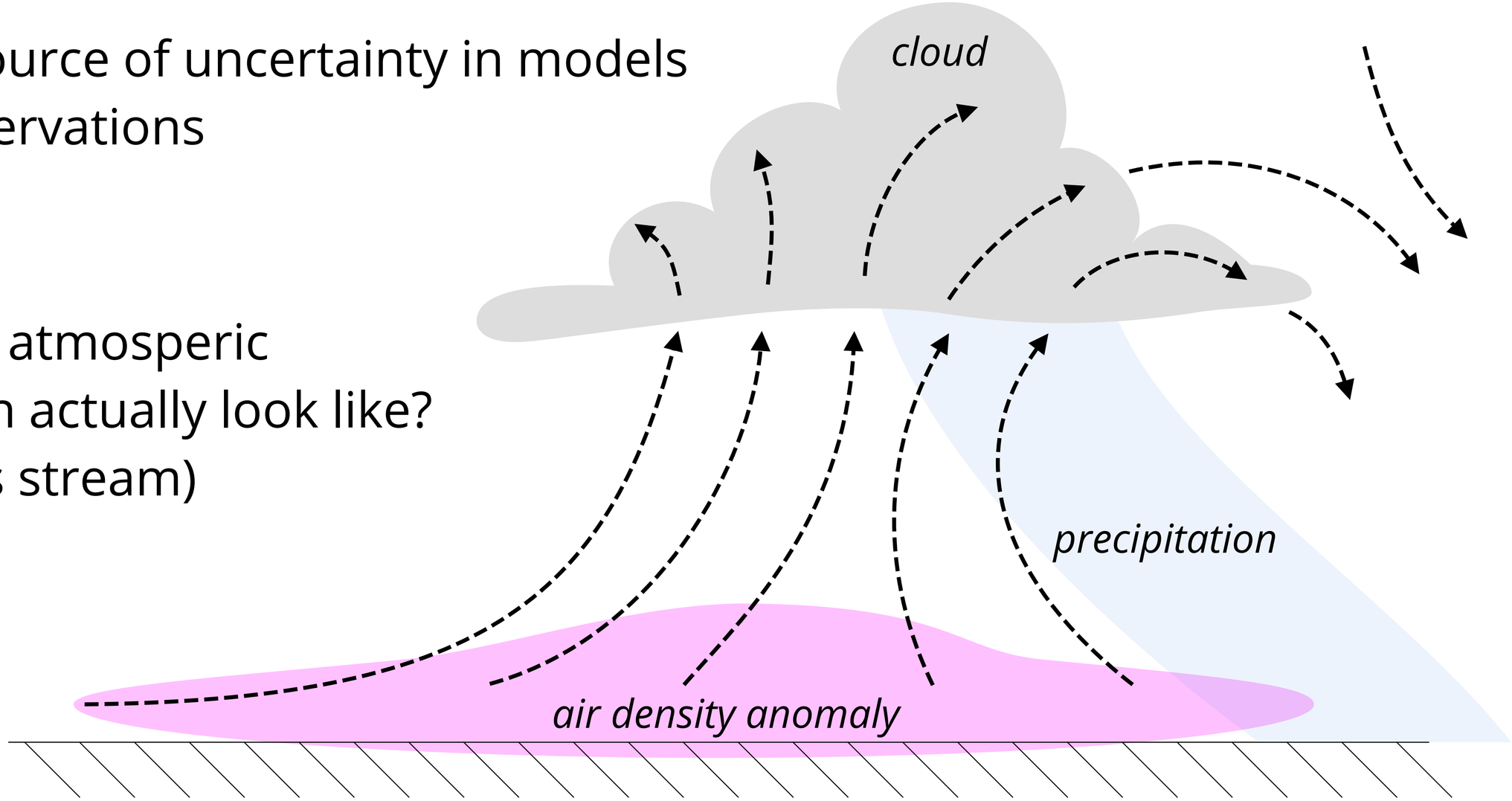
source: https://www.fai.org/ (world air sports federation)

Why atmospheric convection?

A major source of uncertainty in models & few observations

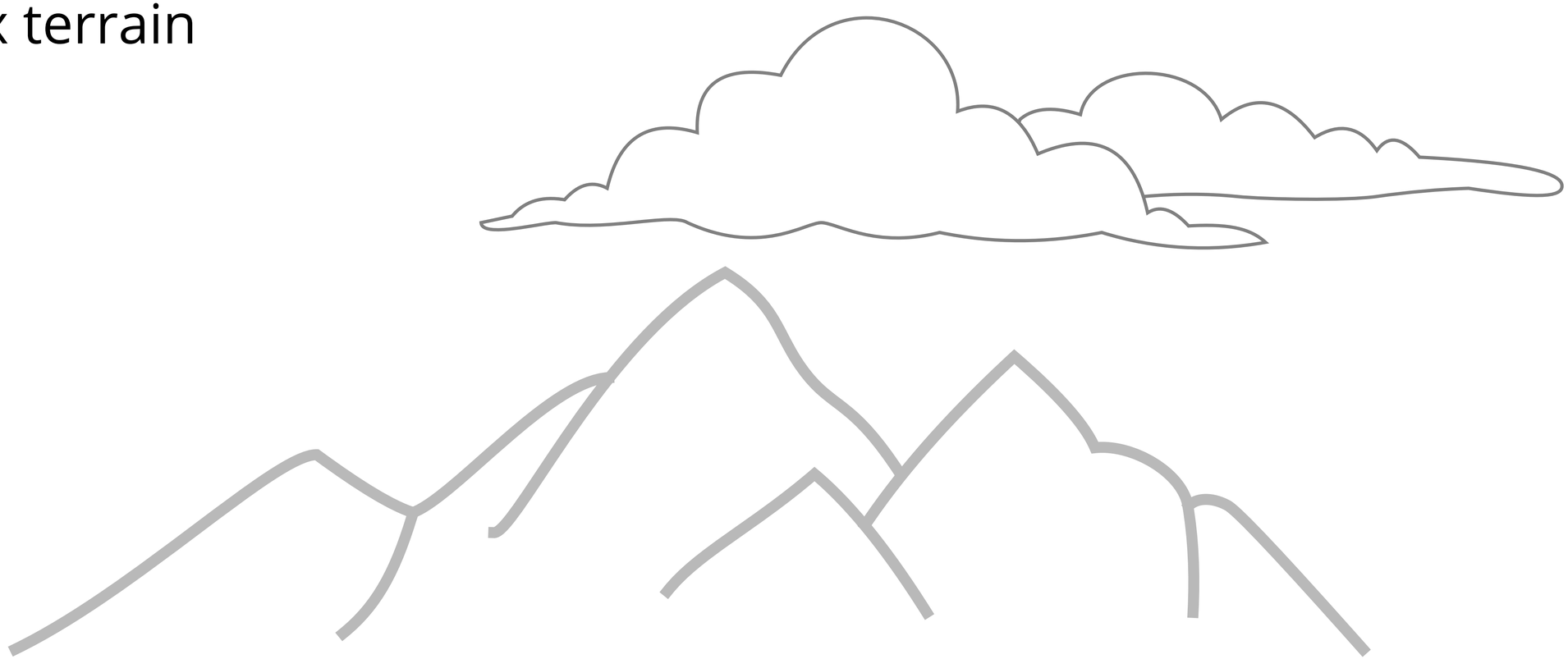
How does atmosperic convection actually look like? (Bubble vs stream)



based on: Klunkel et al. 1977

What is the goal of the gLidar project?

Increase the quantity and quality of autmospheric convection observations in complex terrain



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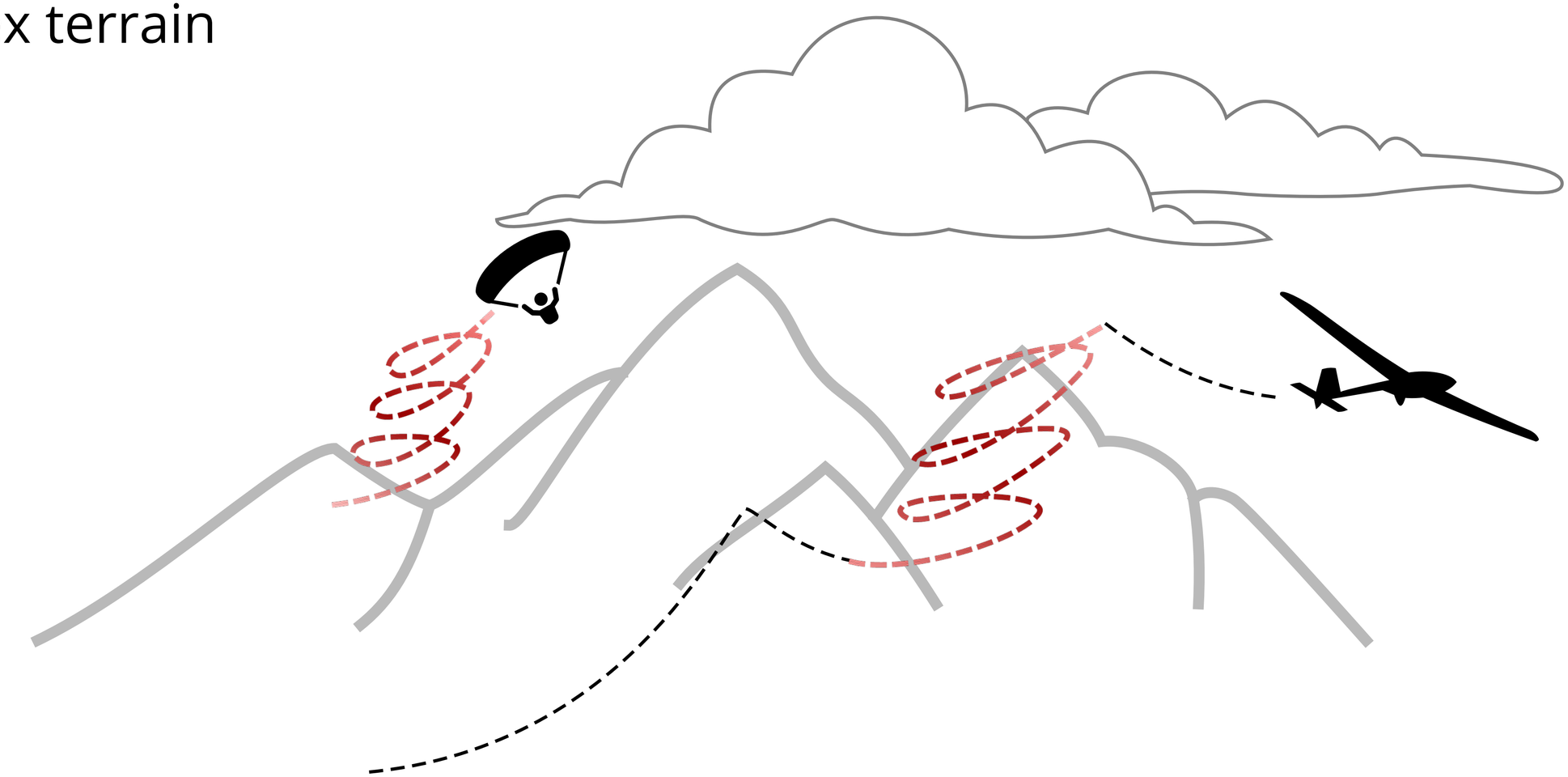
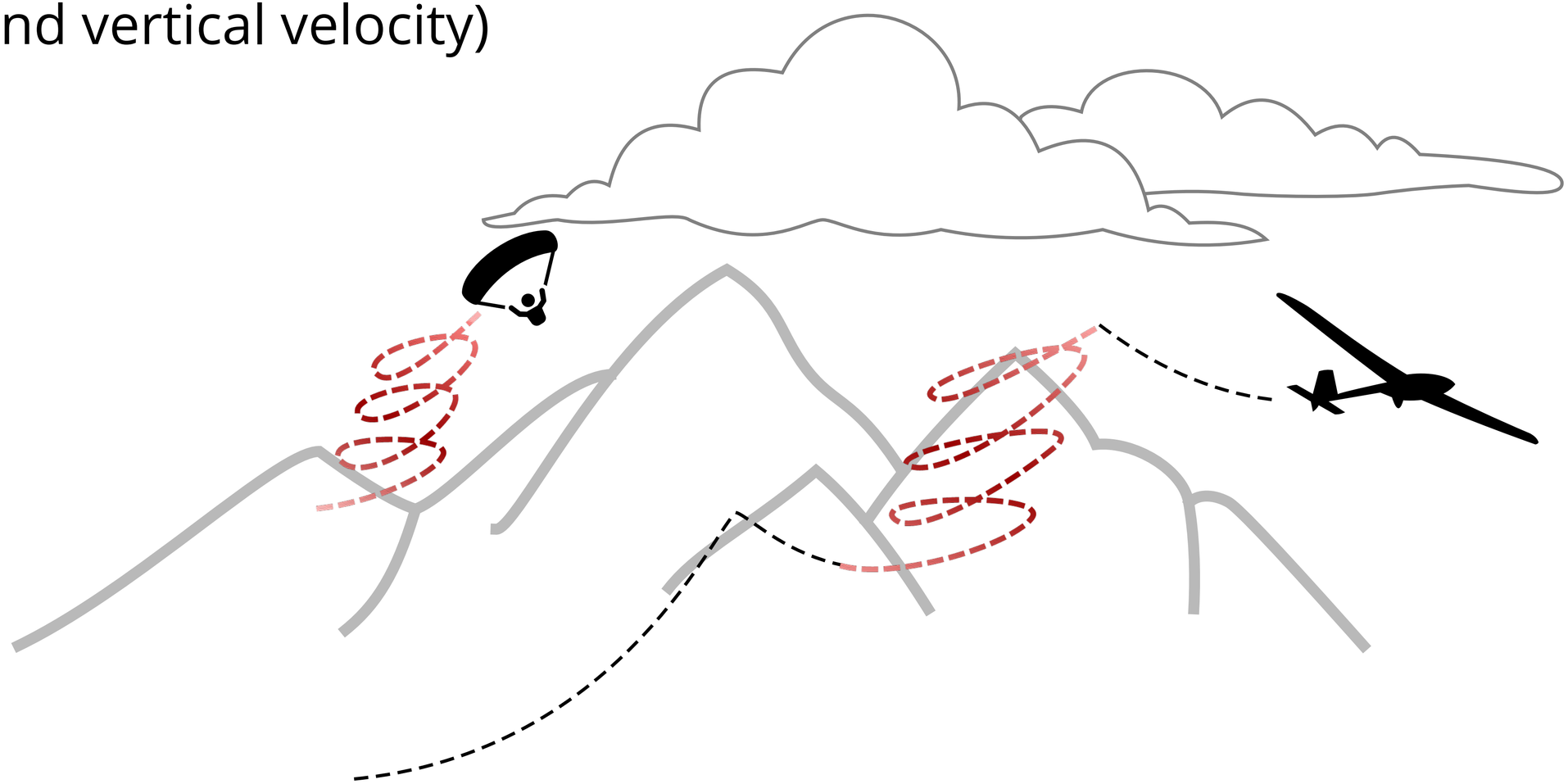


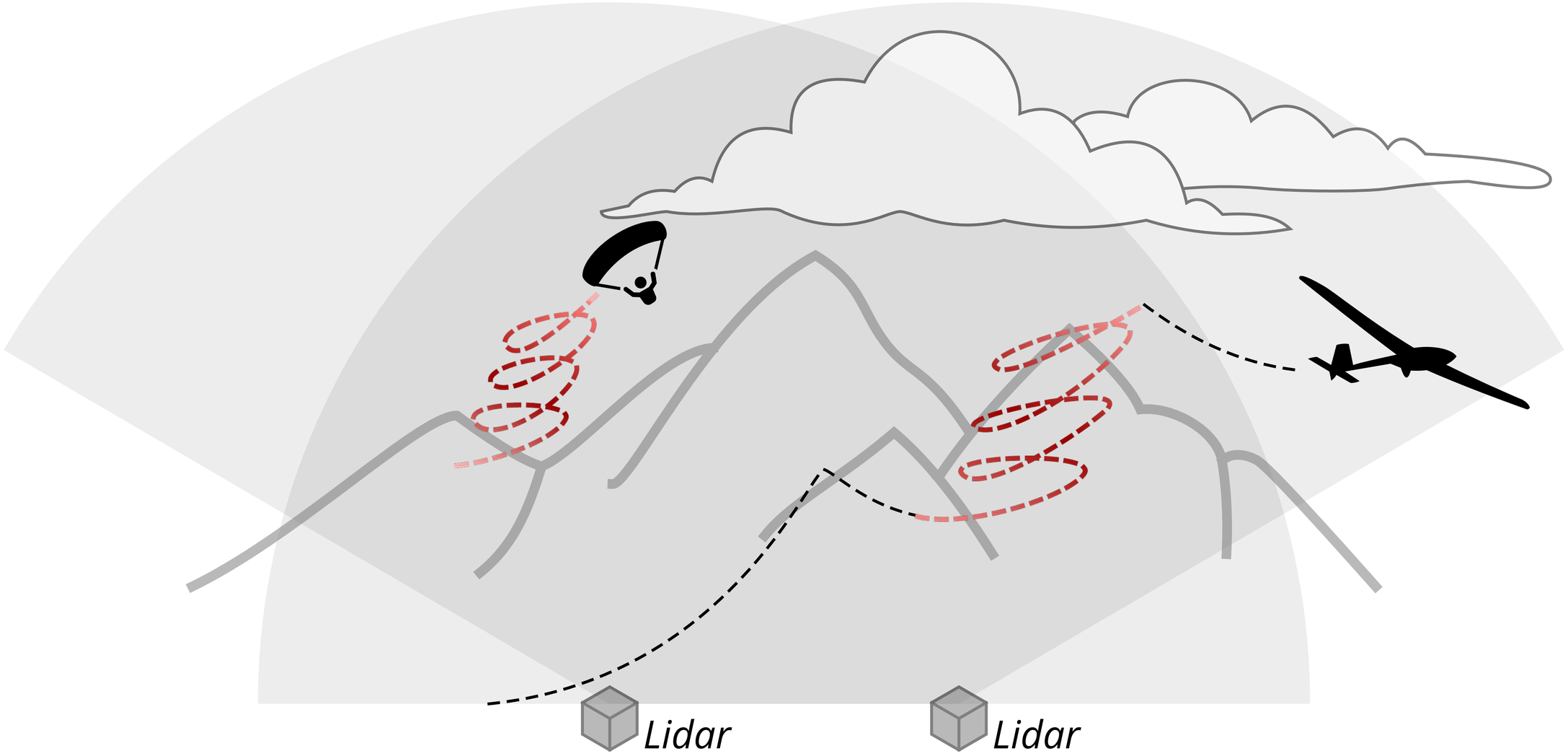
Methodology

Information on core of convection from glider track logs
(Position and vertical velocity)



Methodology

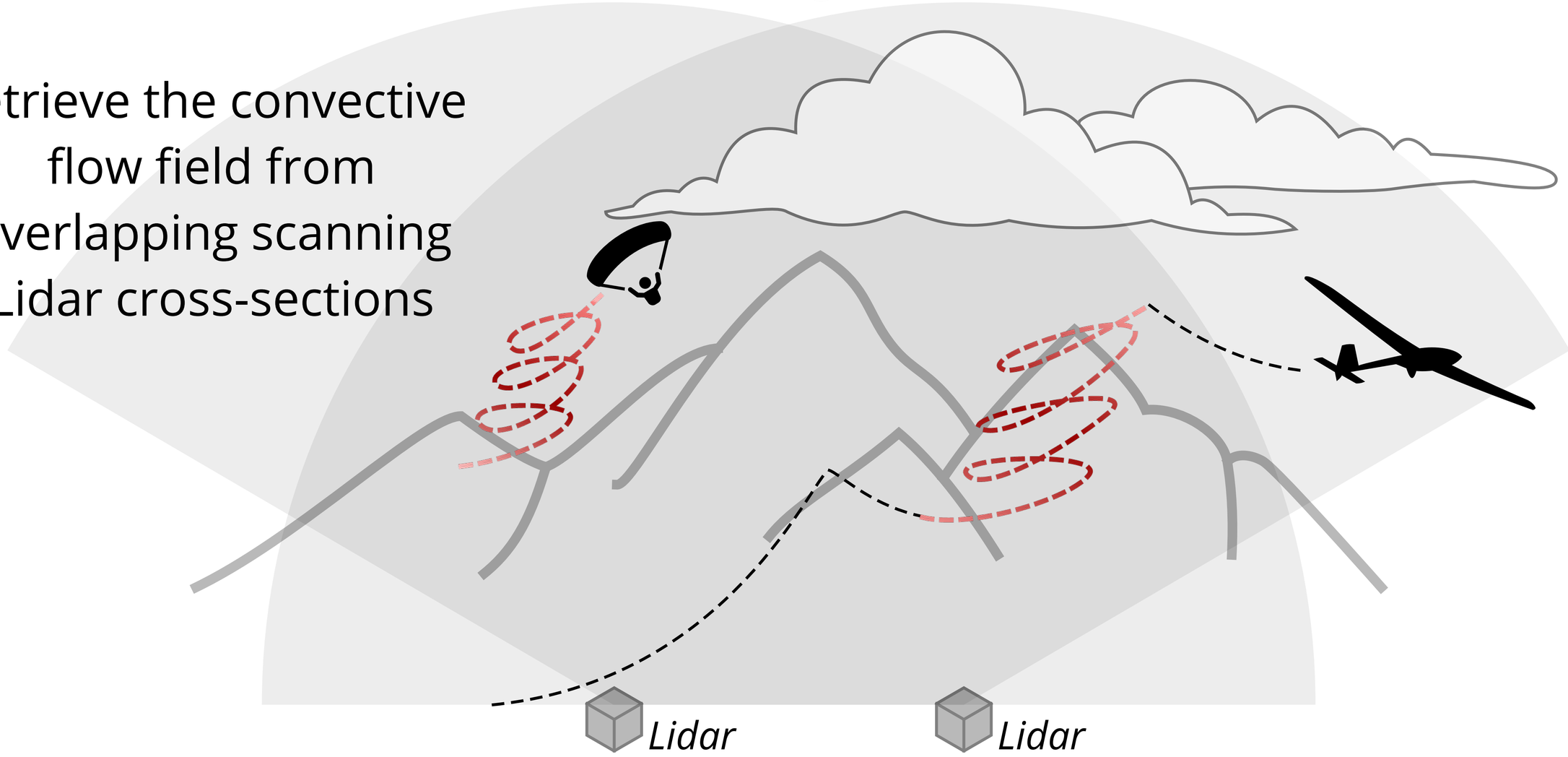
collocate observations from Lidar and glider



Methodology

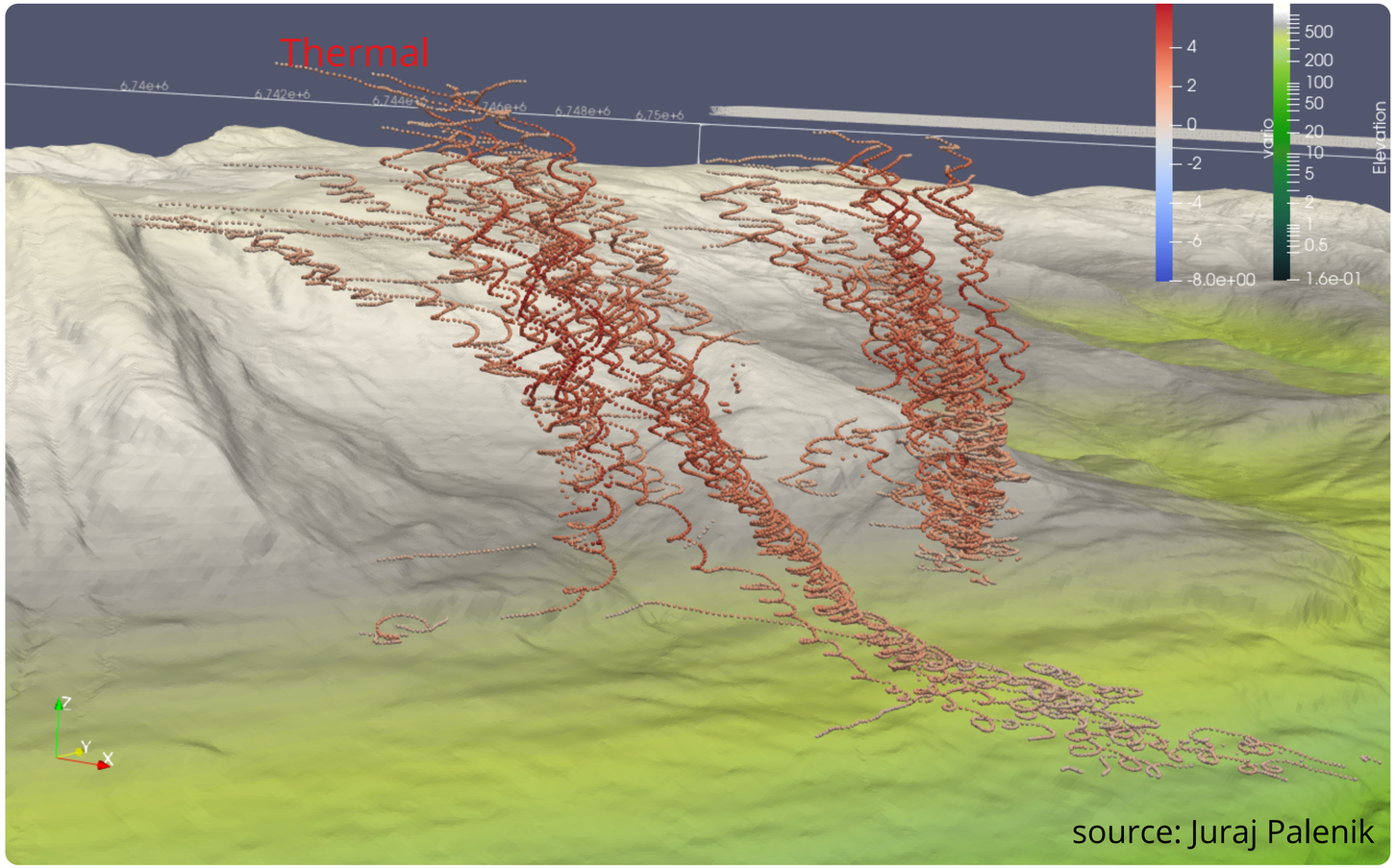
collocate observations from Lidar and glider

retrieve the convective flow field from overlapping scanning Lidar cross-sections

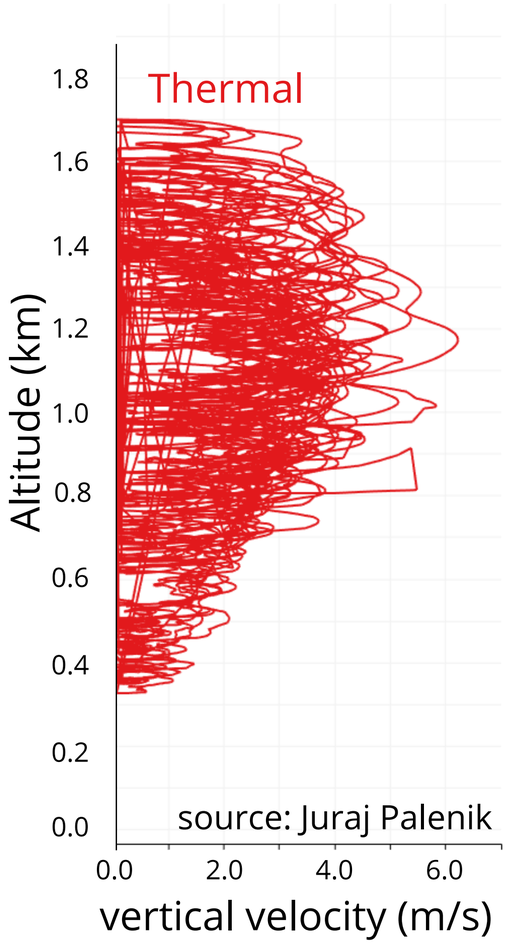


Position and vertical velocity of convection from glider tracks

Norwegian paraglider competition 2019

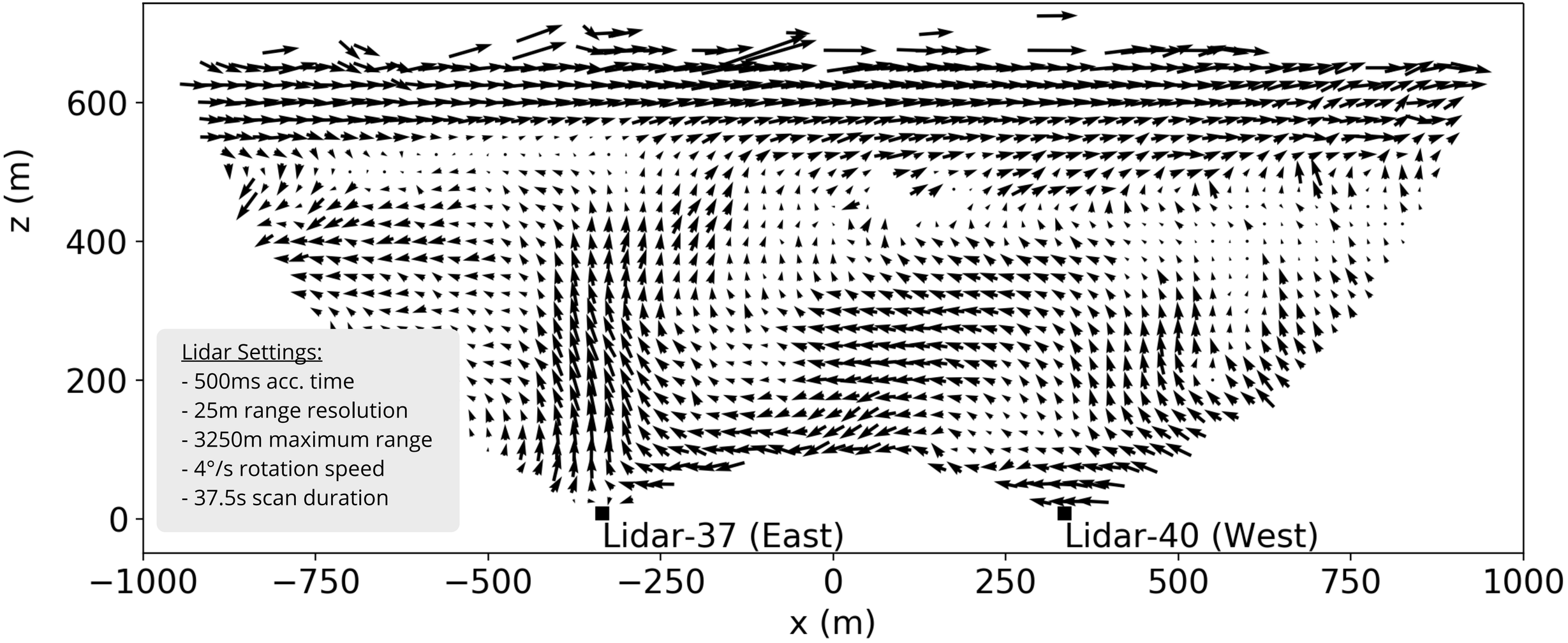


Vertical velocity composite

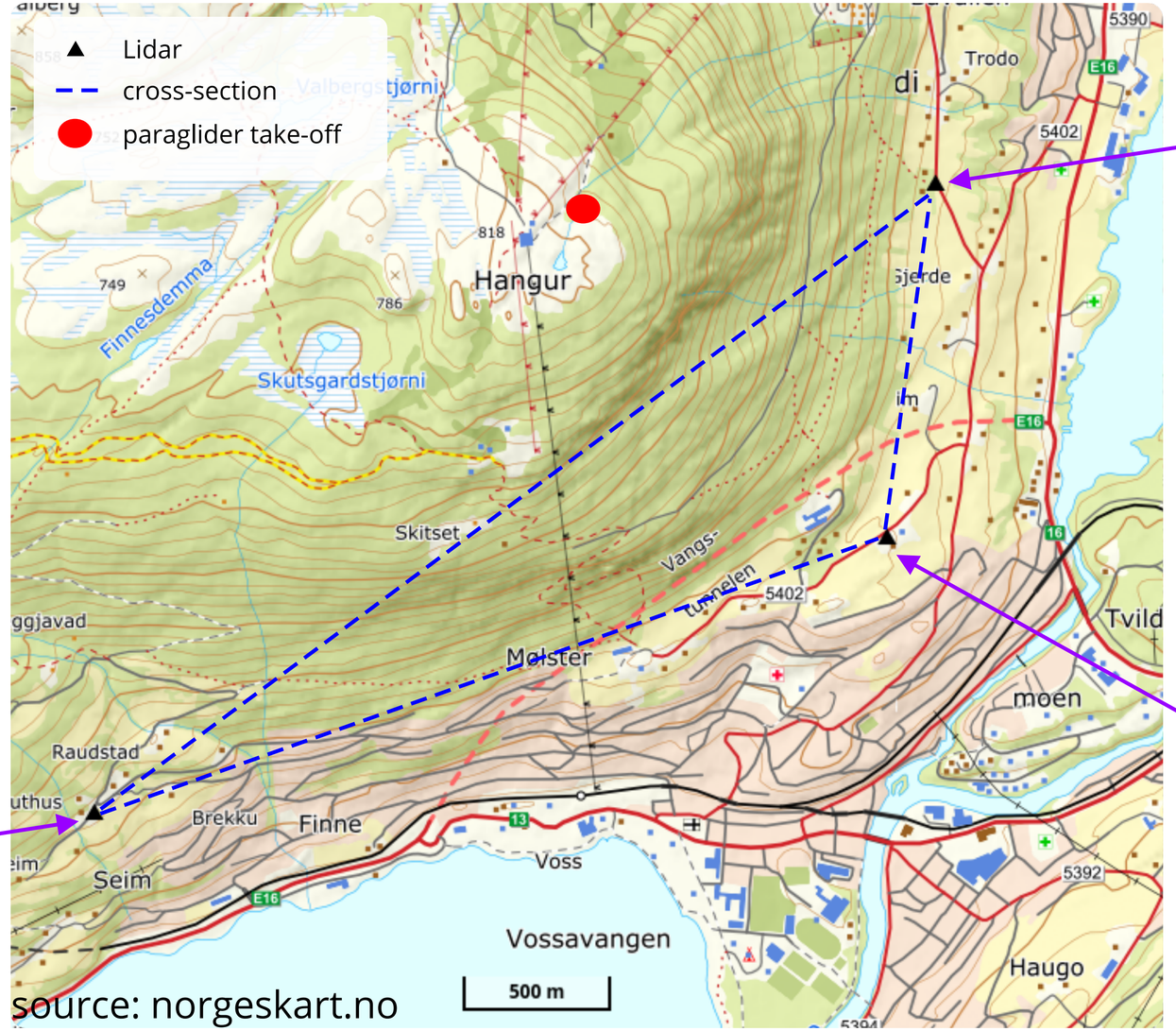


Reconstructed wind field from Lidar observations

from test campaign in Os, Norway on 28th May 2021



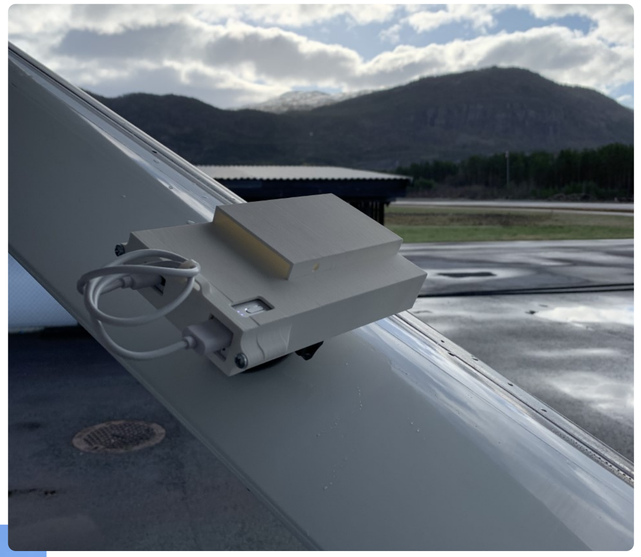
The measurement campaign in Voss, April - June 2022



source: norgeskart.no

In situ profiles from paraglider and plane

Convective temperature and humidity anomaly



Within the convection vs. background profiles

source: Juraj Palenik

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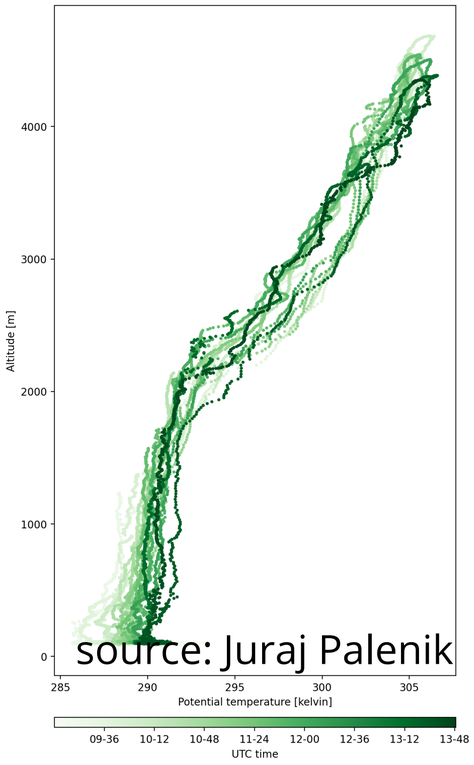

source: Juraj Palenik

Summary Outlook

- Retrive characteristics of the thermals' cores from glider trajectories

- Develope Lidar scanning pattern and retrieval, optimised to observe the convective flow field in complex terrain

- Colocated measurement campaign to enable glidar database

- Convective bubble or continuous stream of air?

- How do observations compare to modelled characteristics?

source: https://www.fai.org/ (world air sports federation)