

The role of the lake-land breeze circulation in the formation and propagation of storms over Lake Victoria

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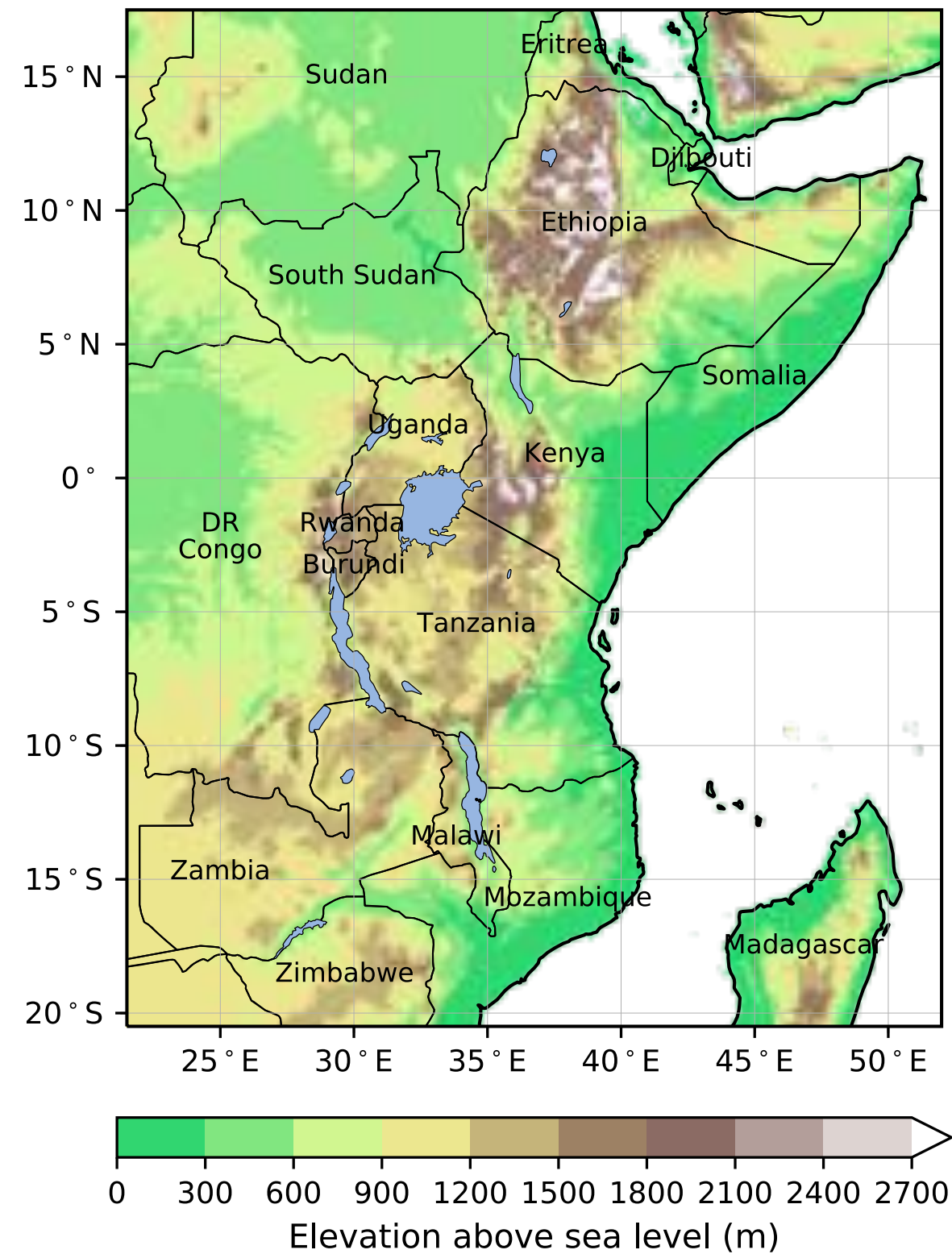
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Lake Victoria



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Lake Victoria

35 million people depend on Lake Victoria to survive

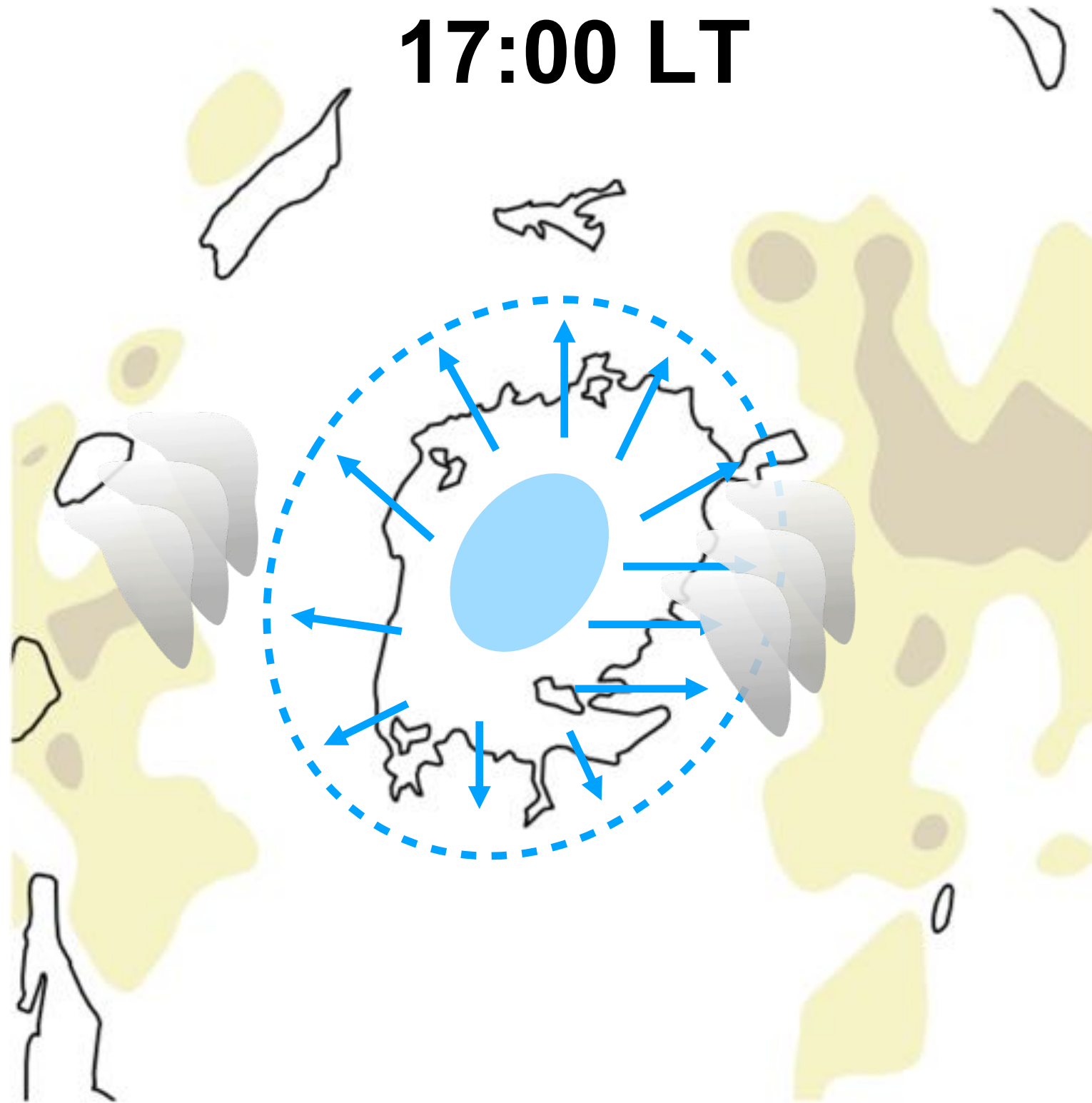
200,000 fishermen use the lake

5000 deaths on the lake each year

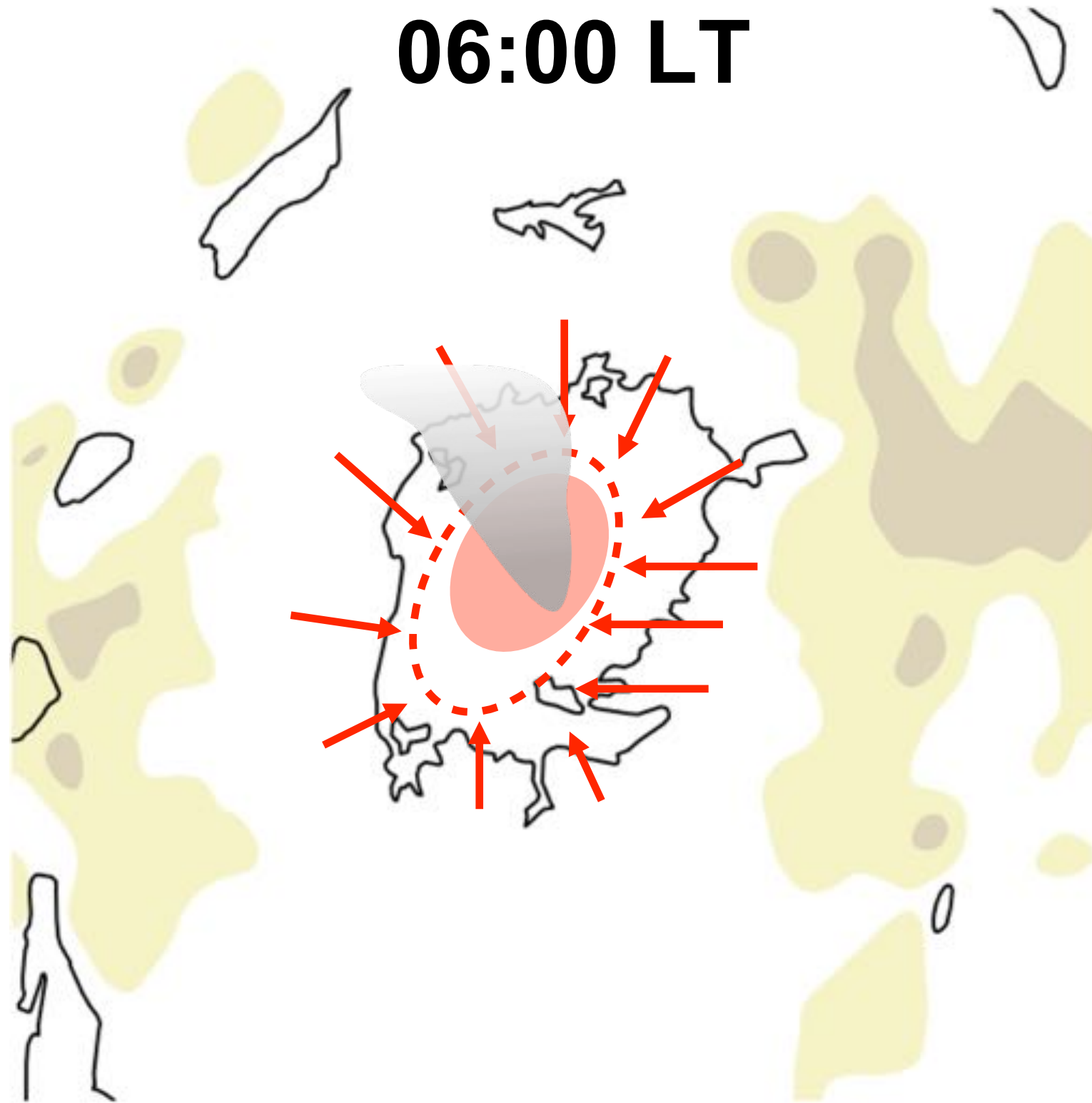
Surrounding land used for agriculture



17:00 LT



06:00 LT



UM Nesting Suite*

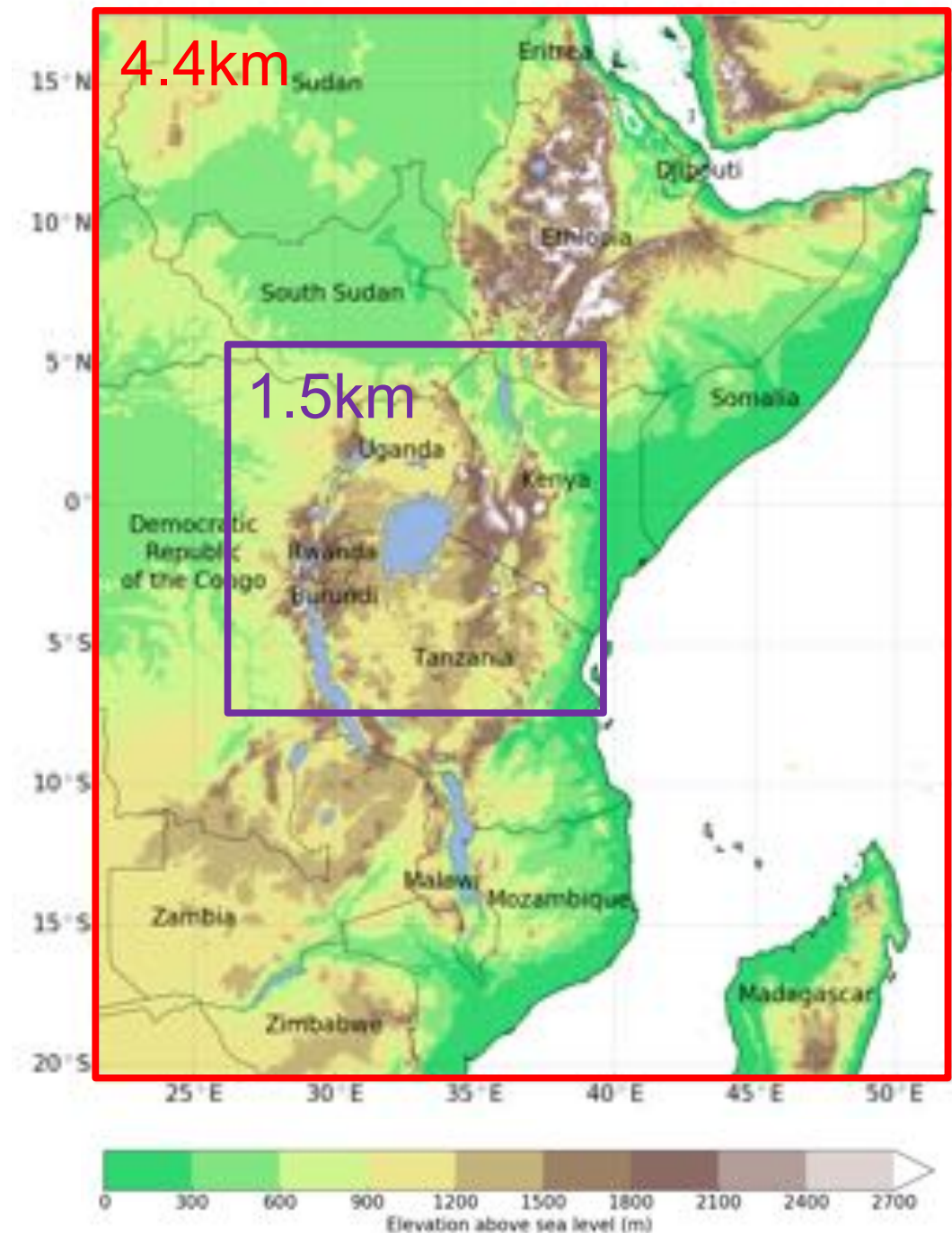
Driving model: UM global mode
(re-run from archived analysis
files)

2 resolutions: 4.4km, 1.5km
SINGV2.1, with Aranami (2015)
moisture conservation

72 hour simulations

Output every hour

* The authors wish to acknowledge to Stu Webster (Met Office)



Case Study 1: Dry Period

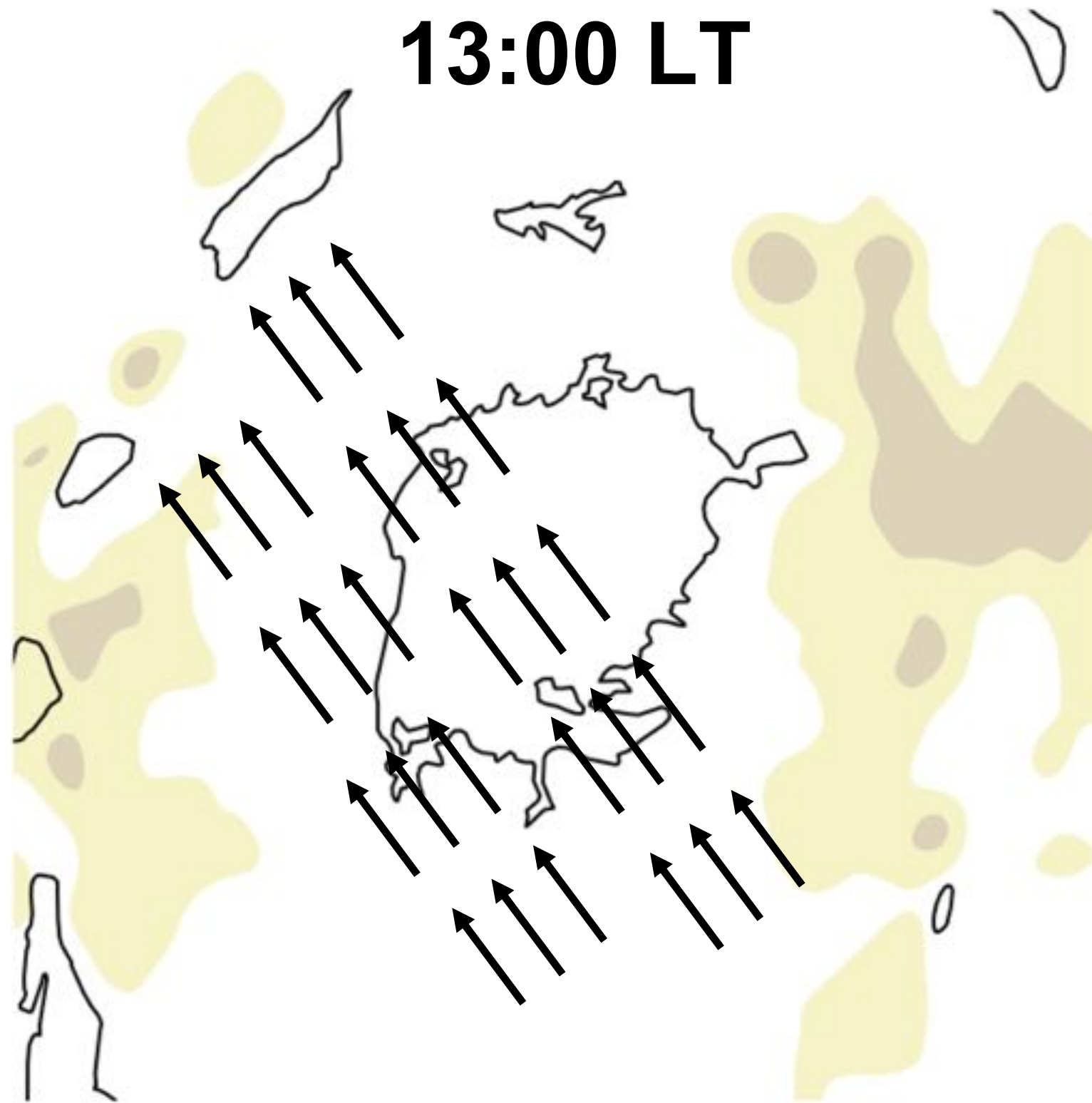
- **July 2015 (dry season)**

Case Study 2: Large Storm

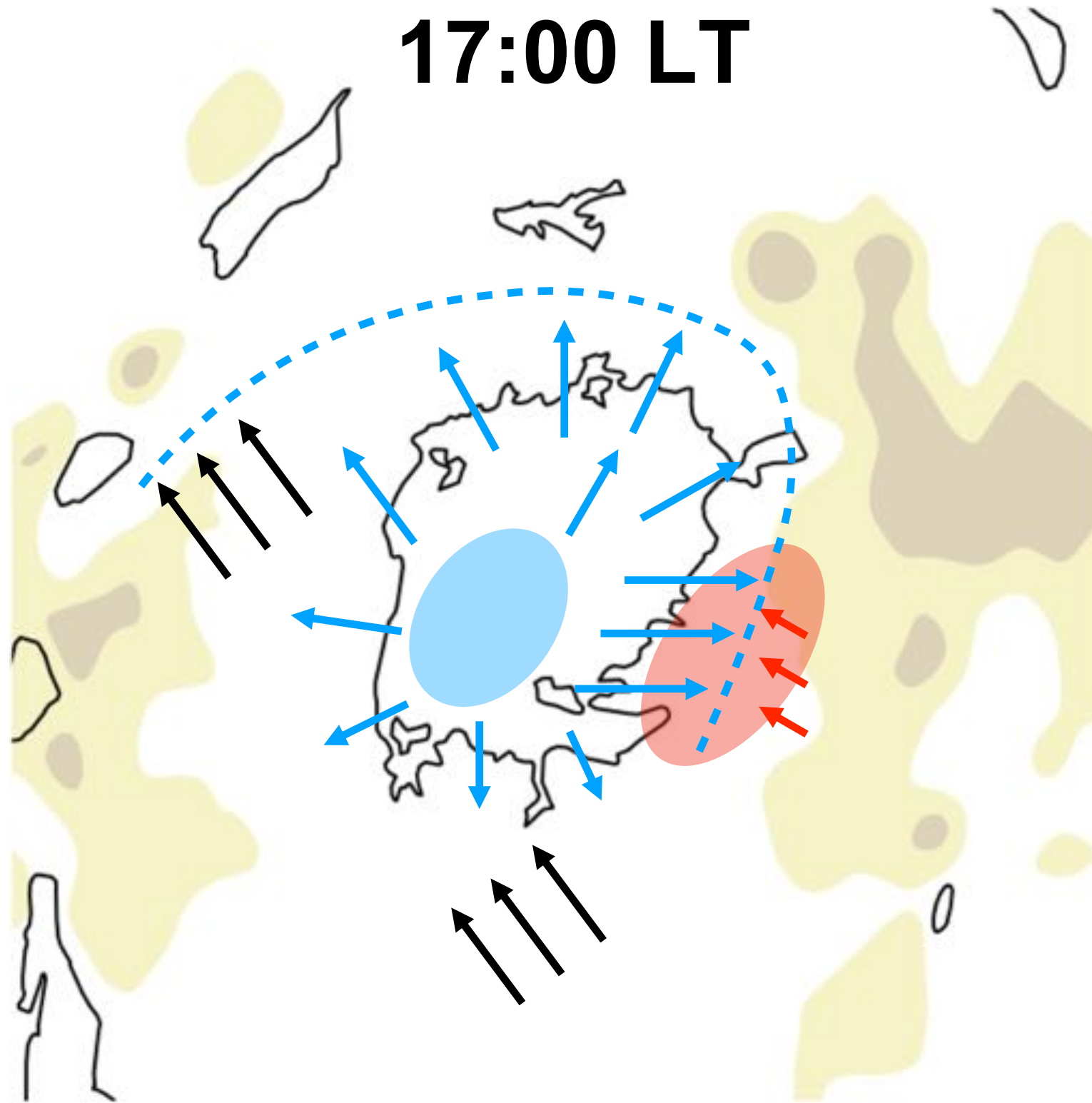
- **May 2015 (Long Rains)**

Case Study 3: Small Storm

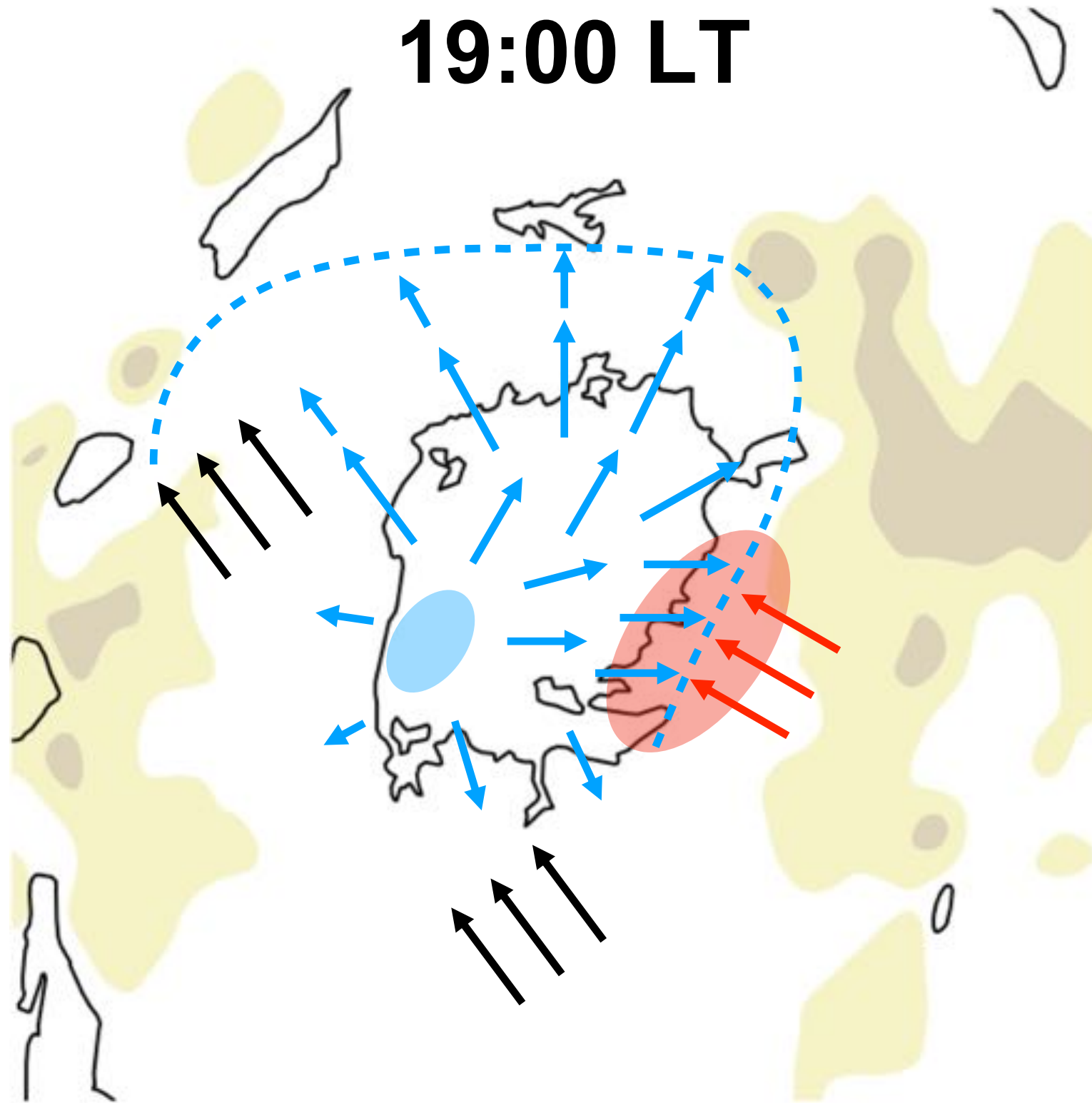
- **July 2016 (dry season)**



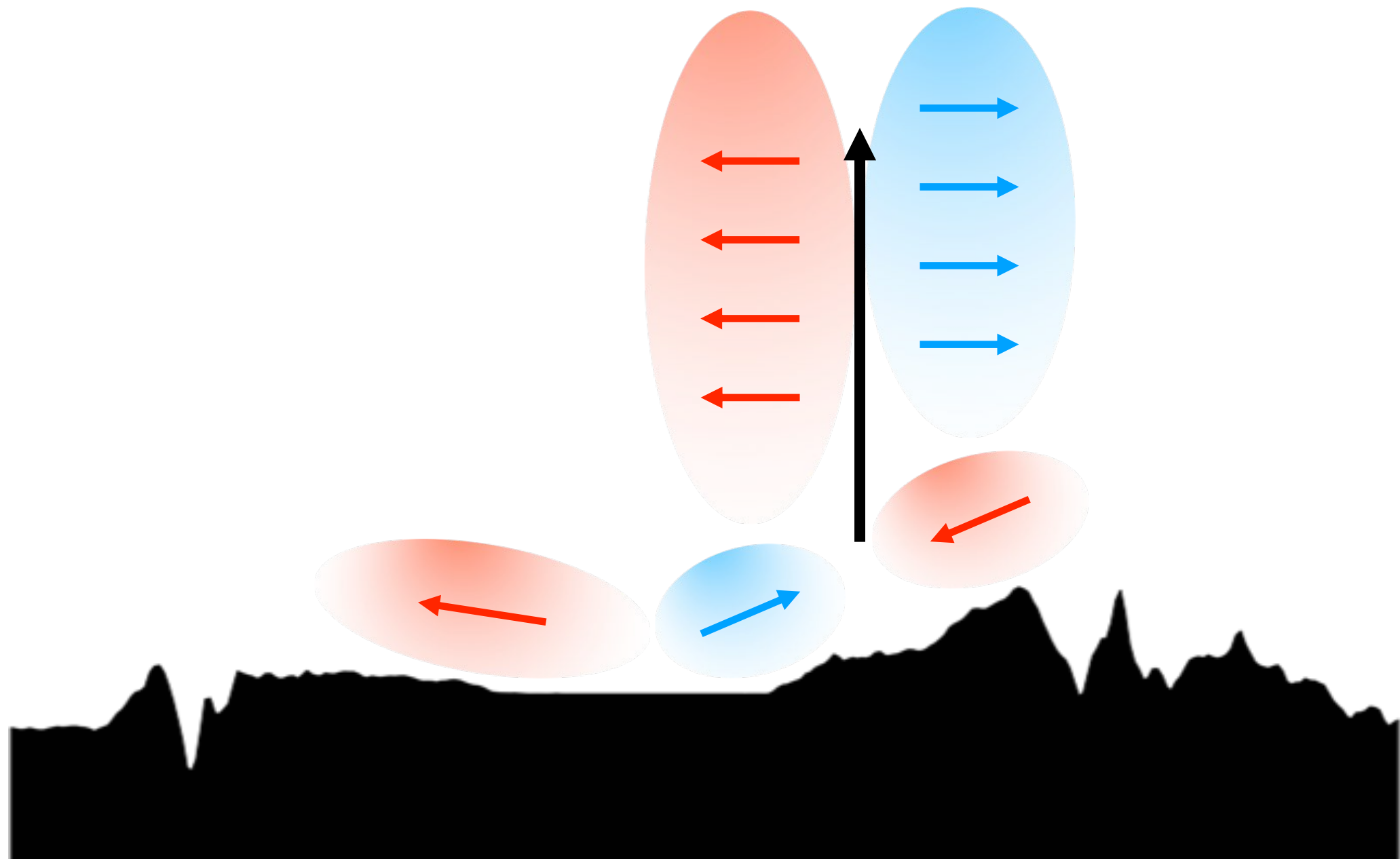
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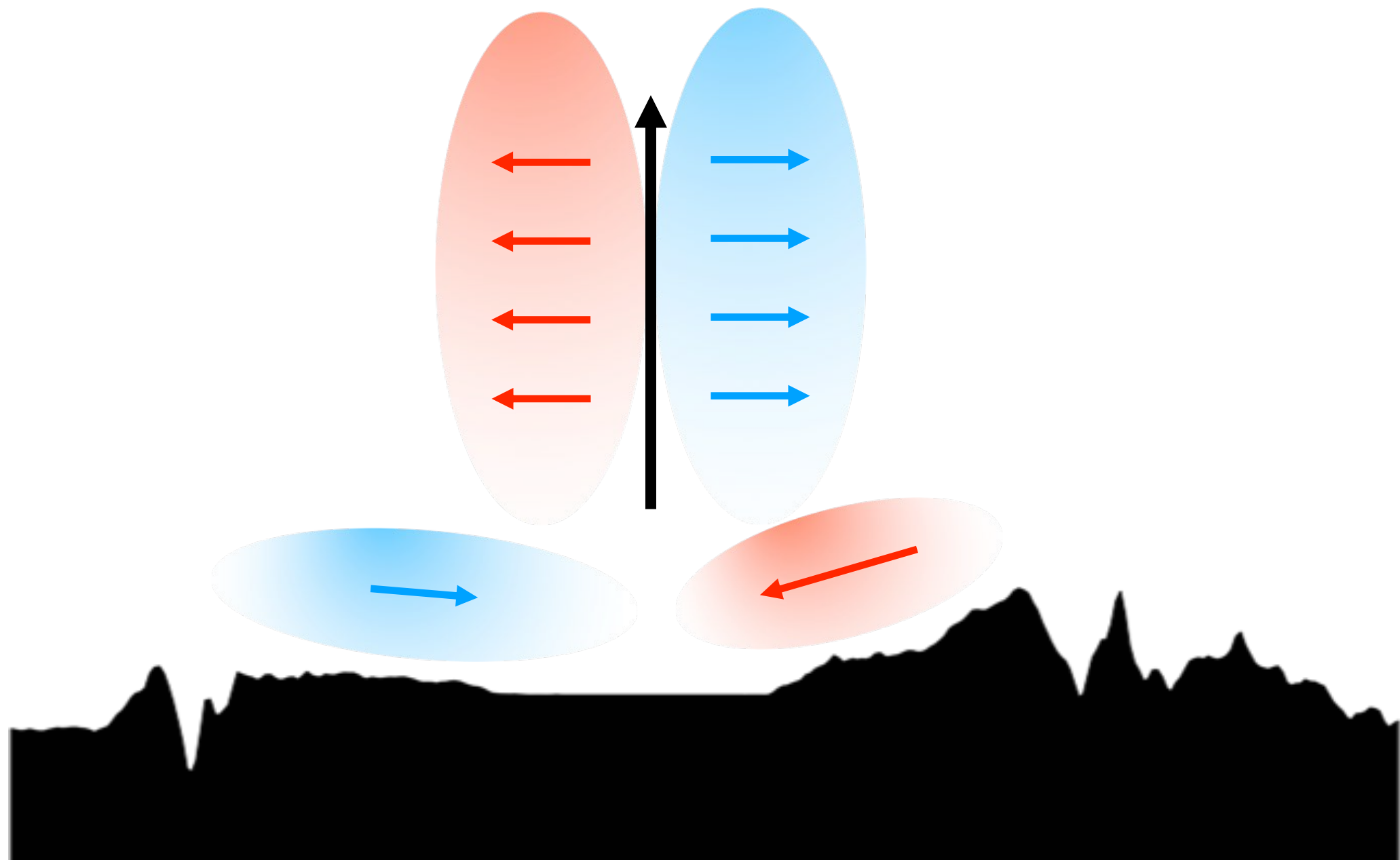
19:00 LT



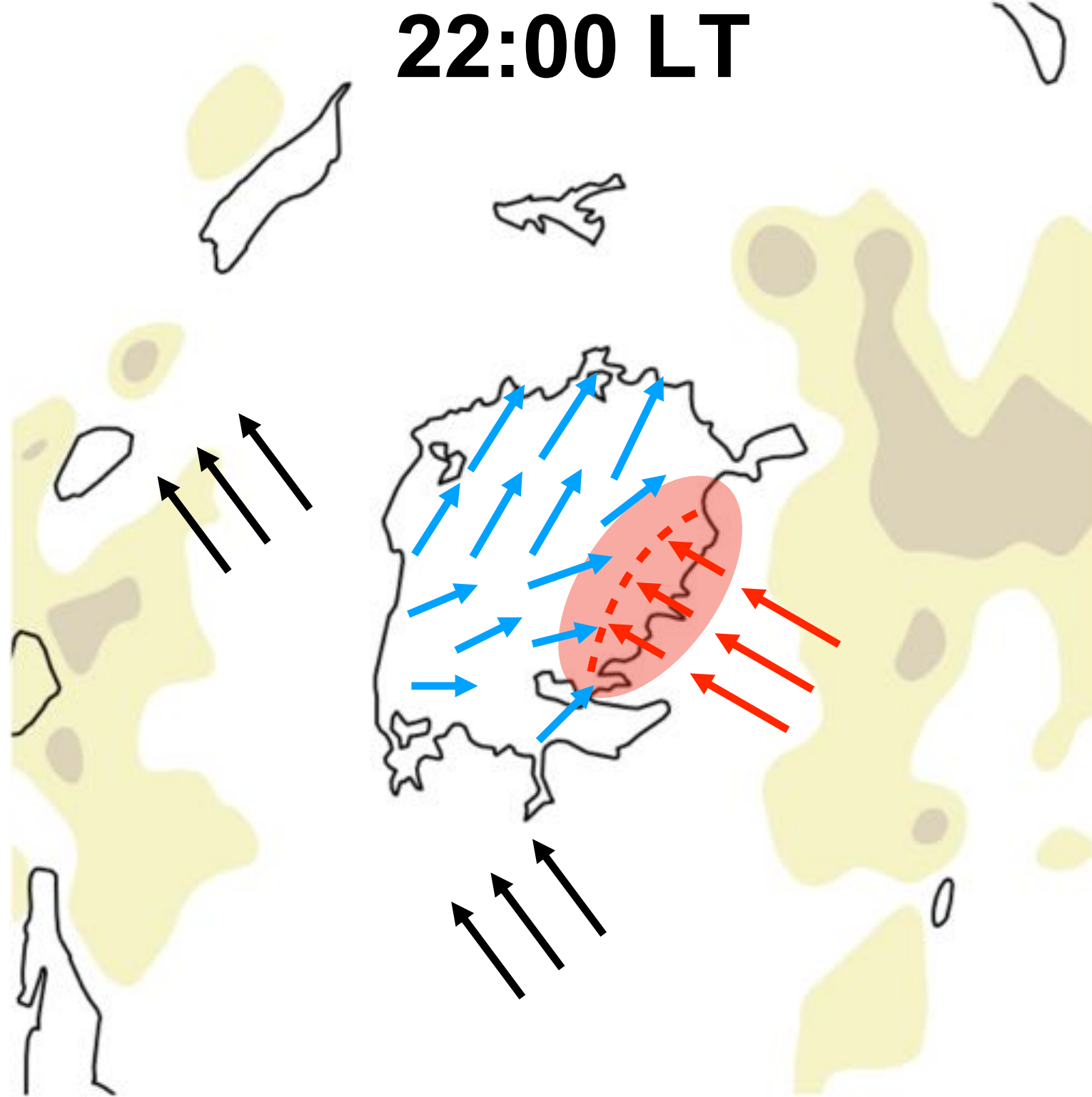
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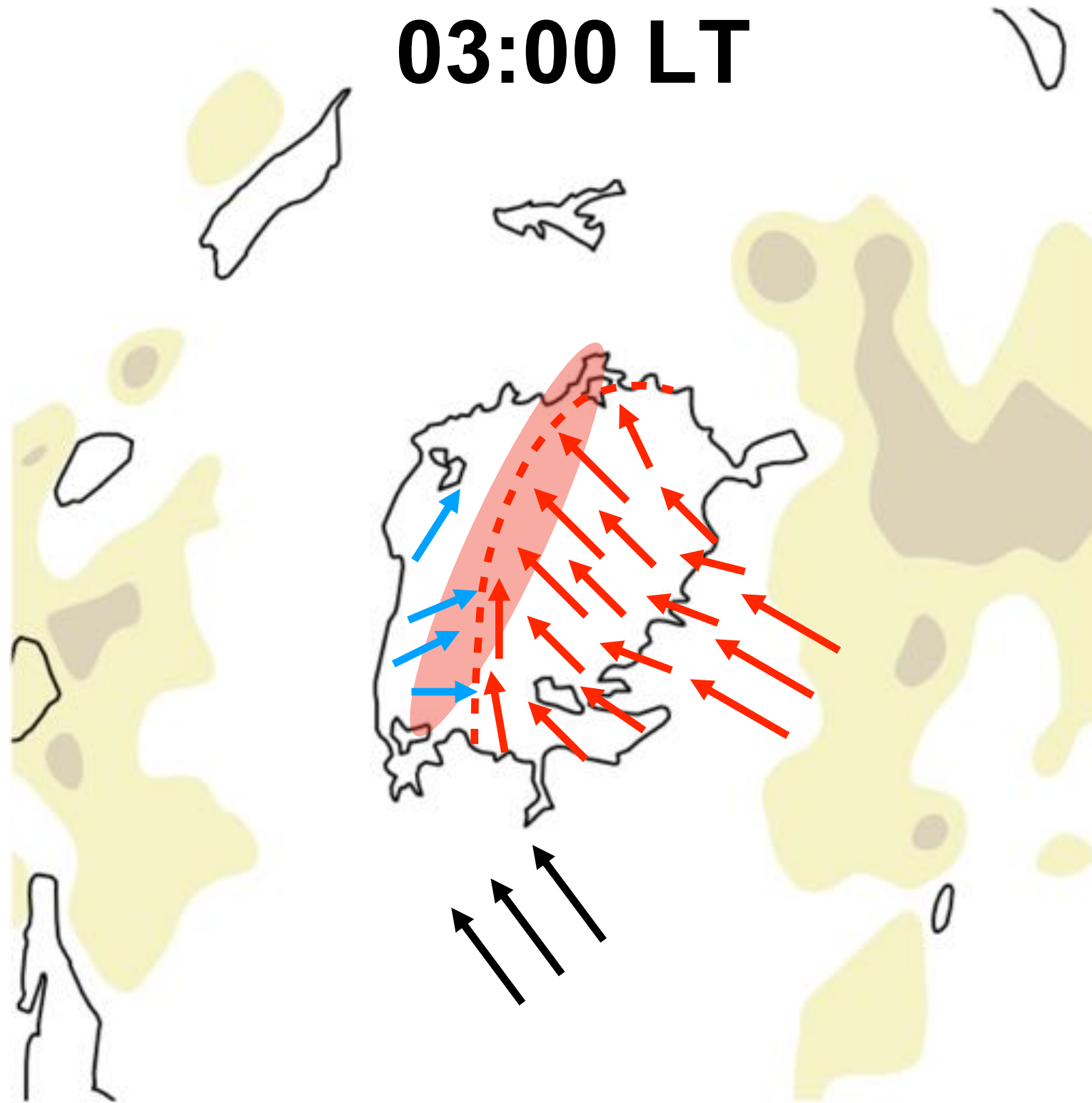
01:00 LT



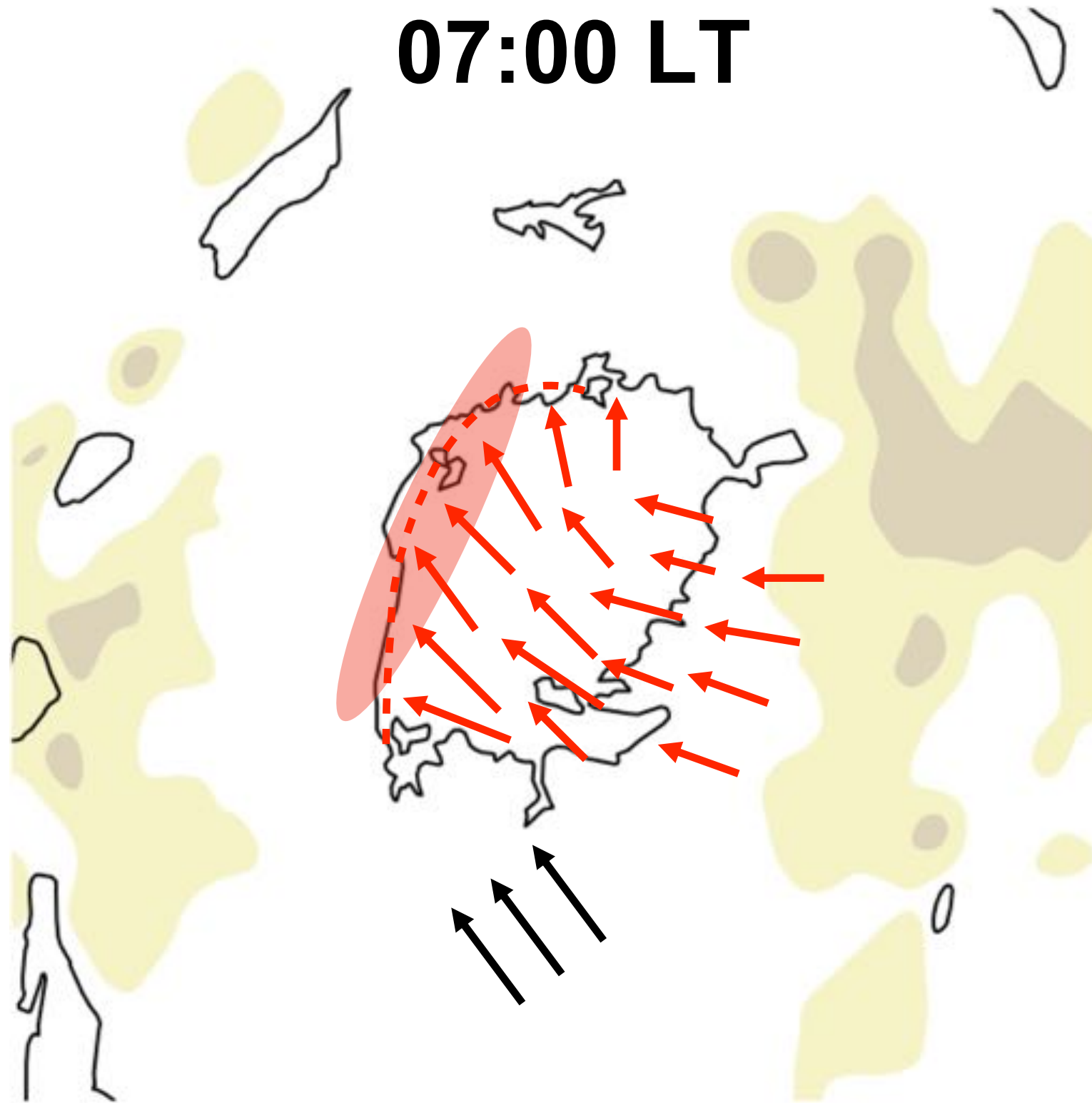
22:00 LT

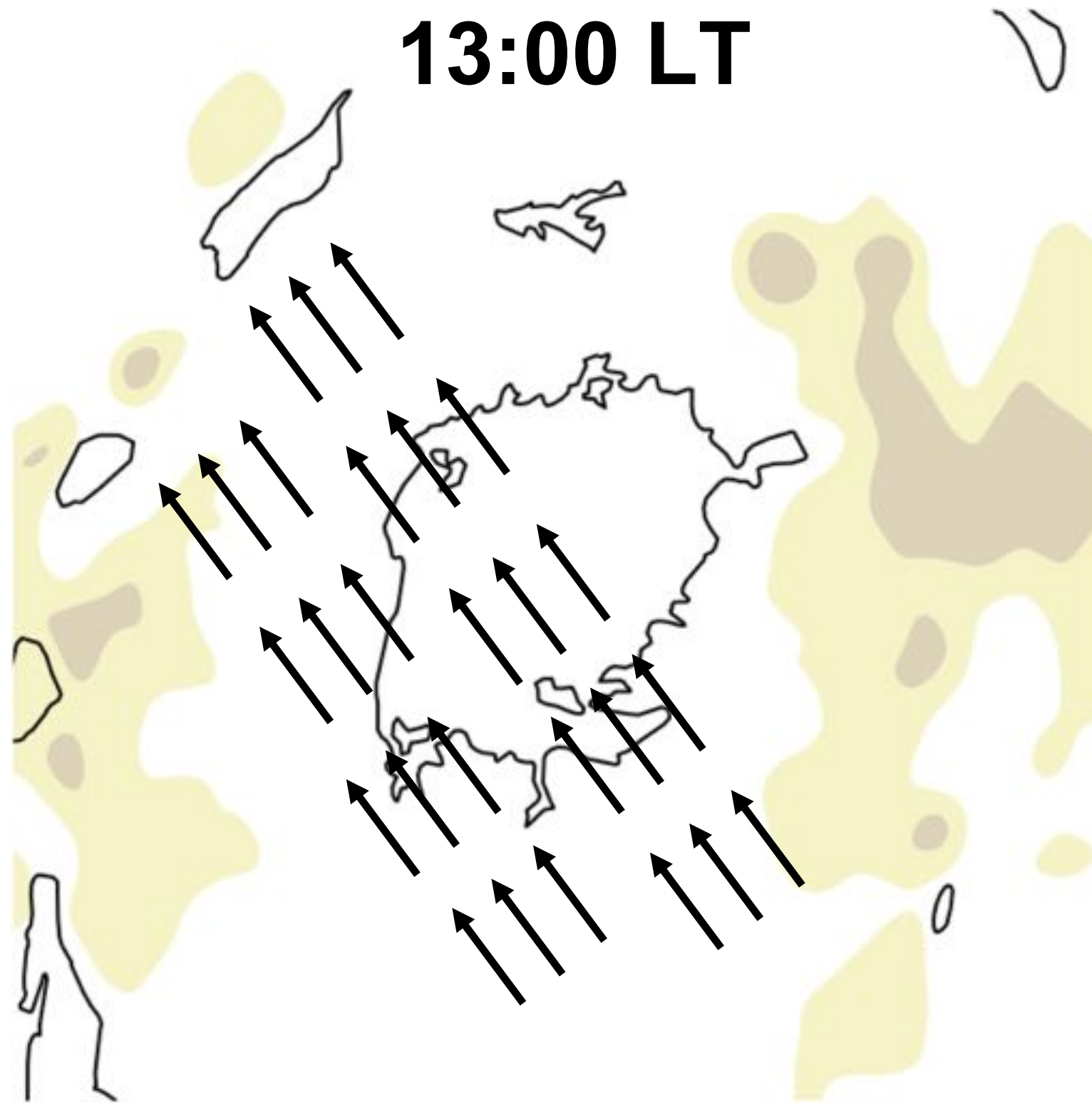


03:00 LT



07:00 LT

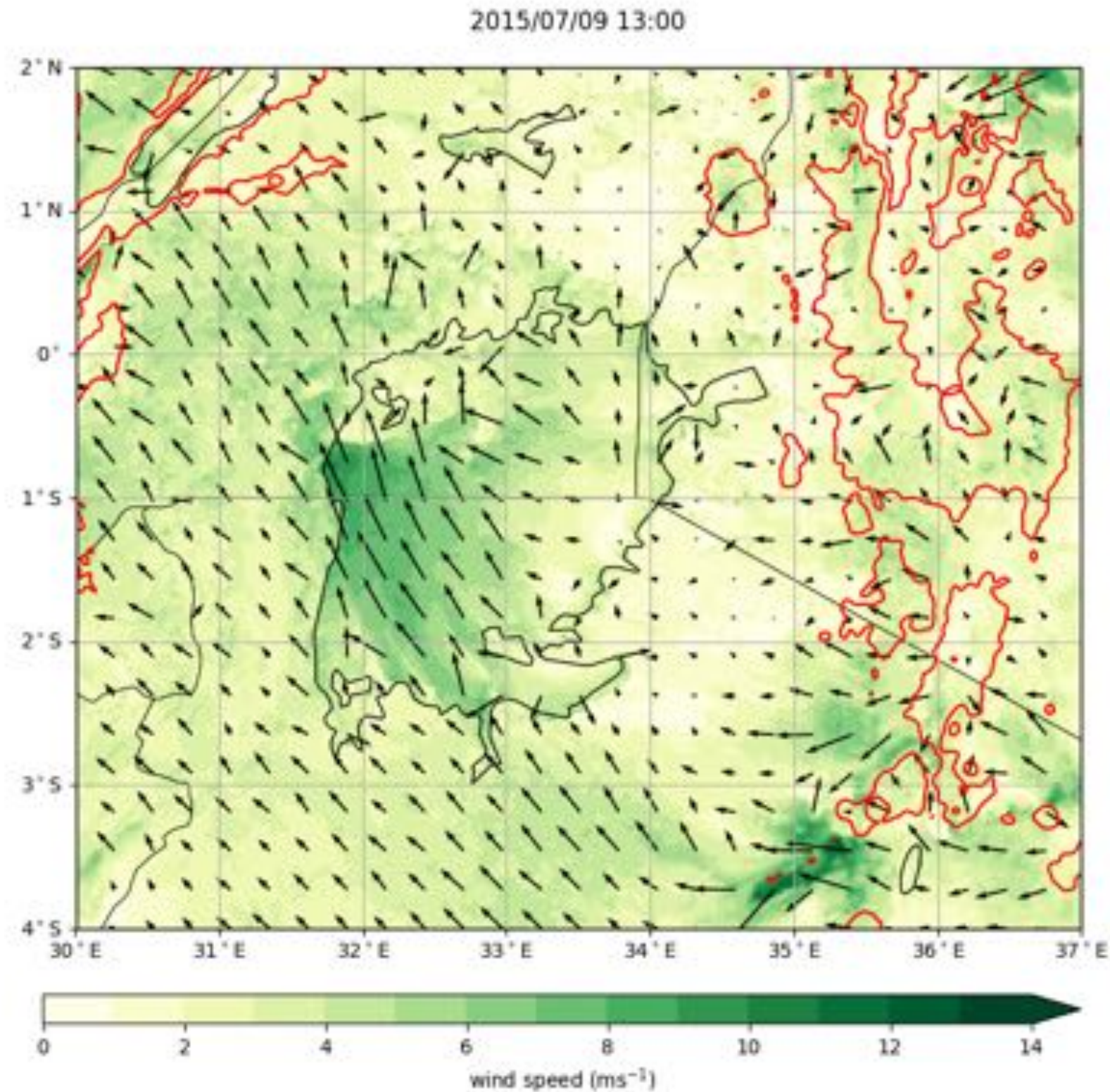




Case Study 1: Dry Period



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Case Study 2: Large Storm

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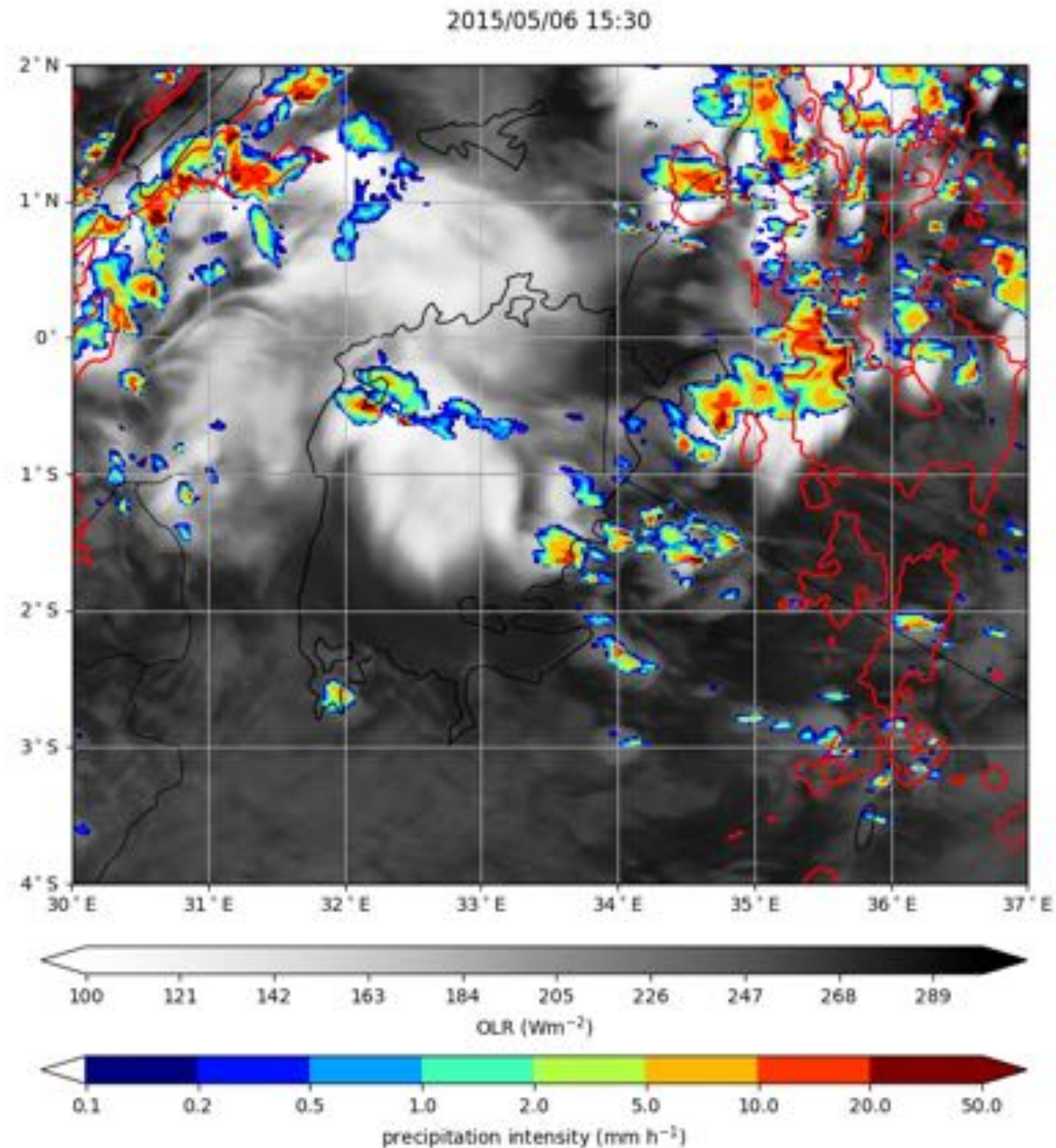
Case Study 3: Small Storm

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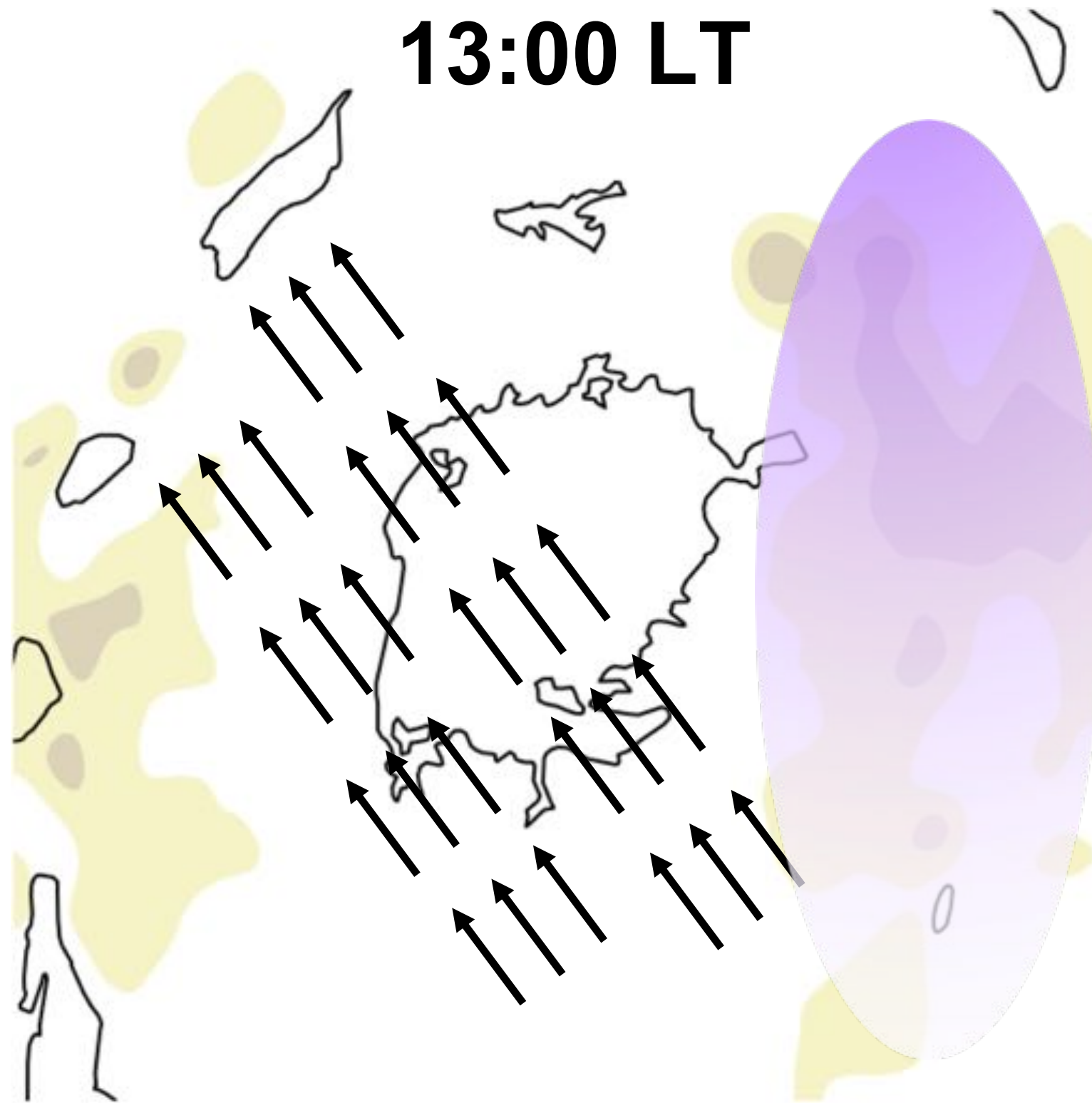
Case Study 2: Large Storm



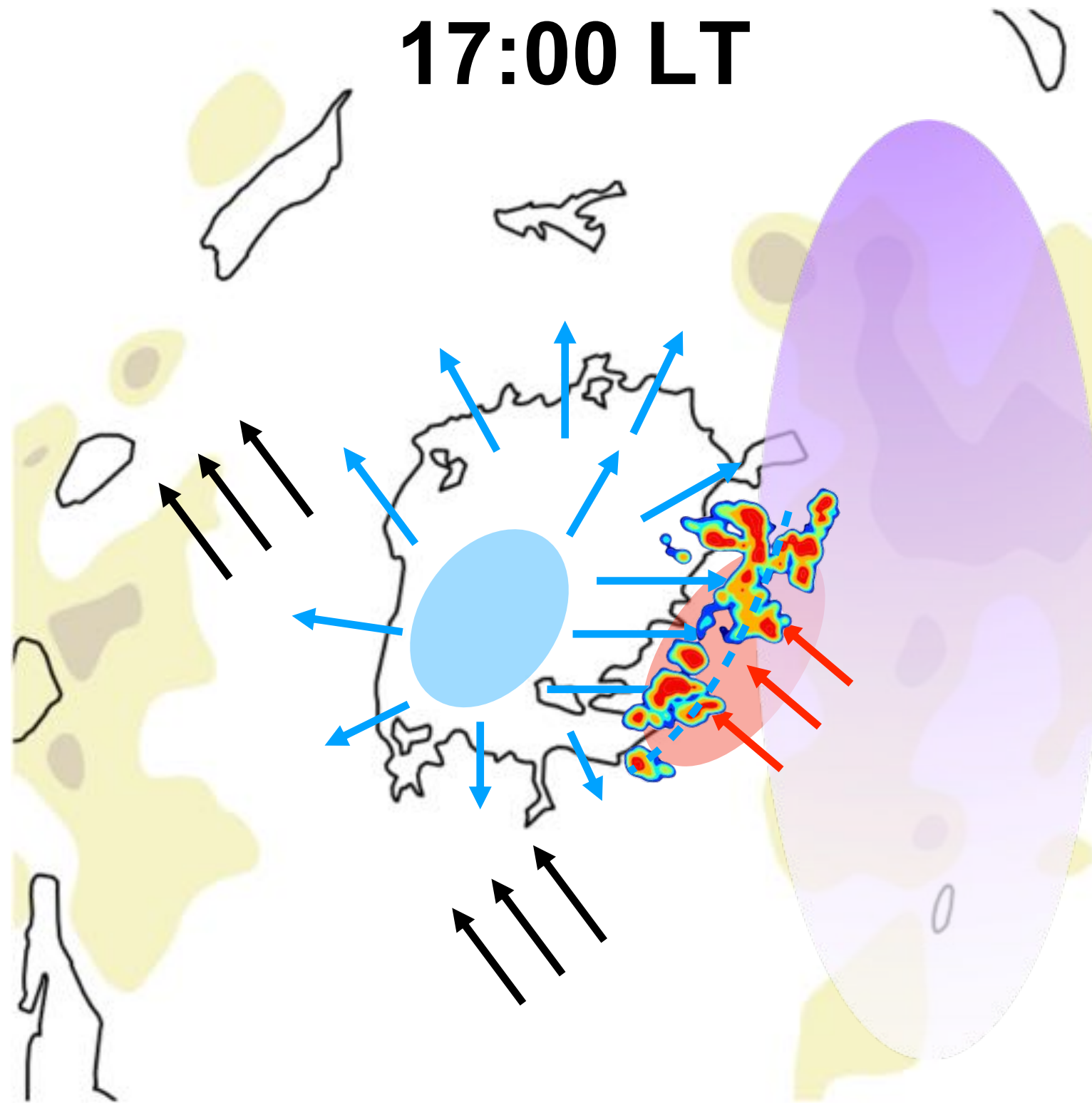
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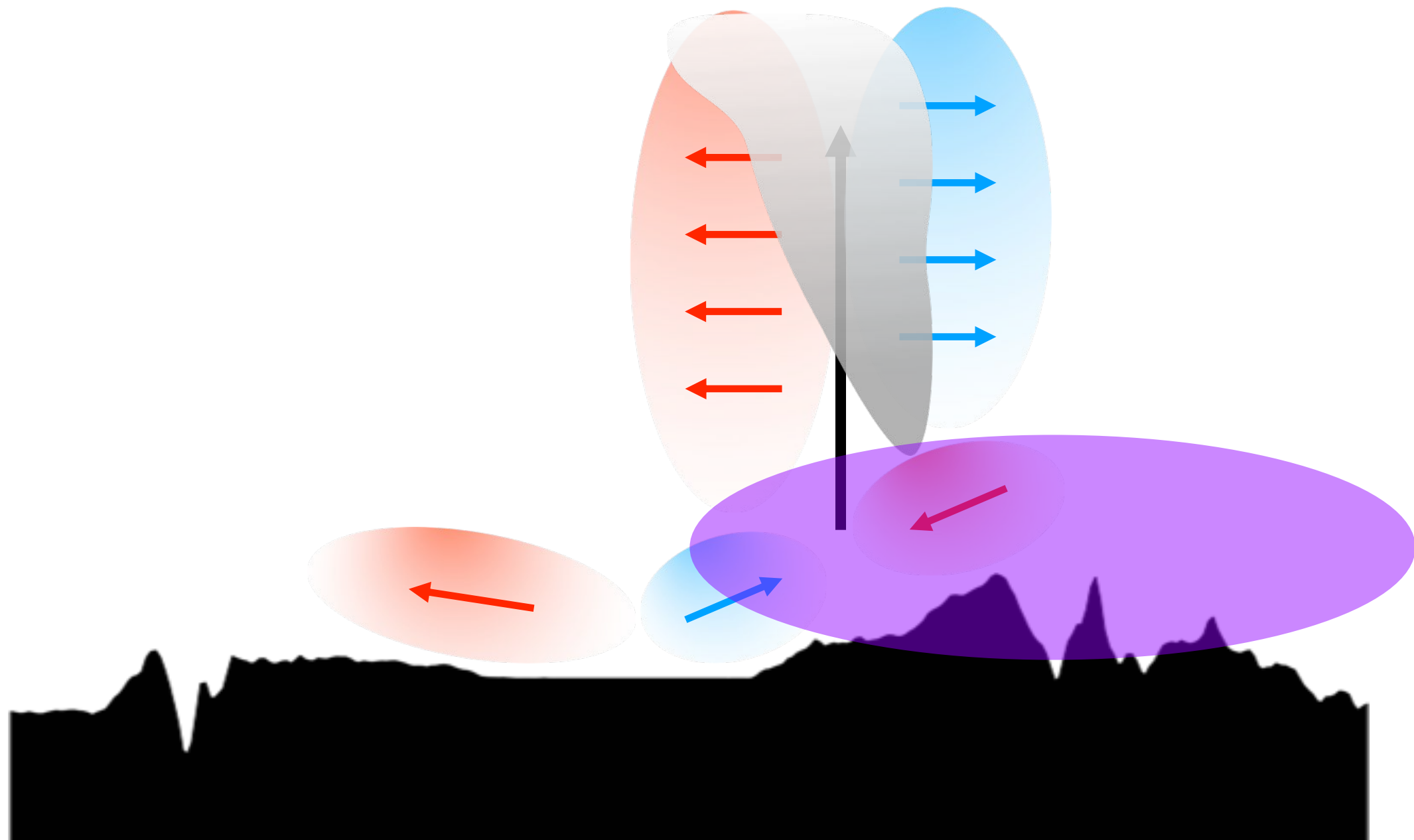
Case Study 2: Large Storm



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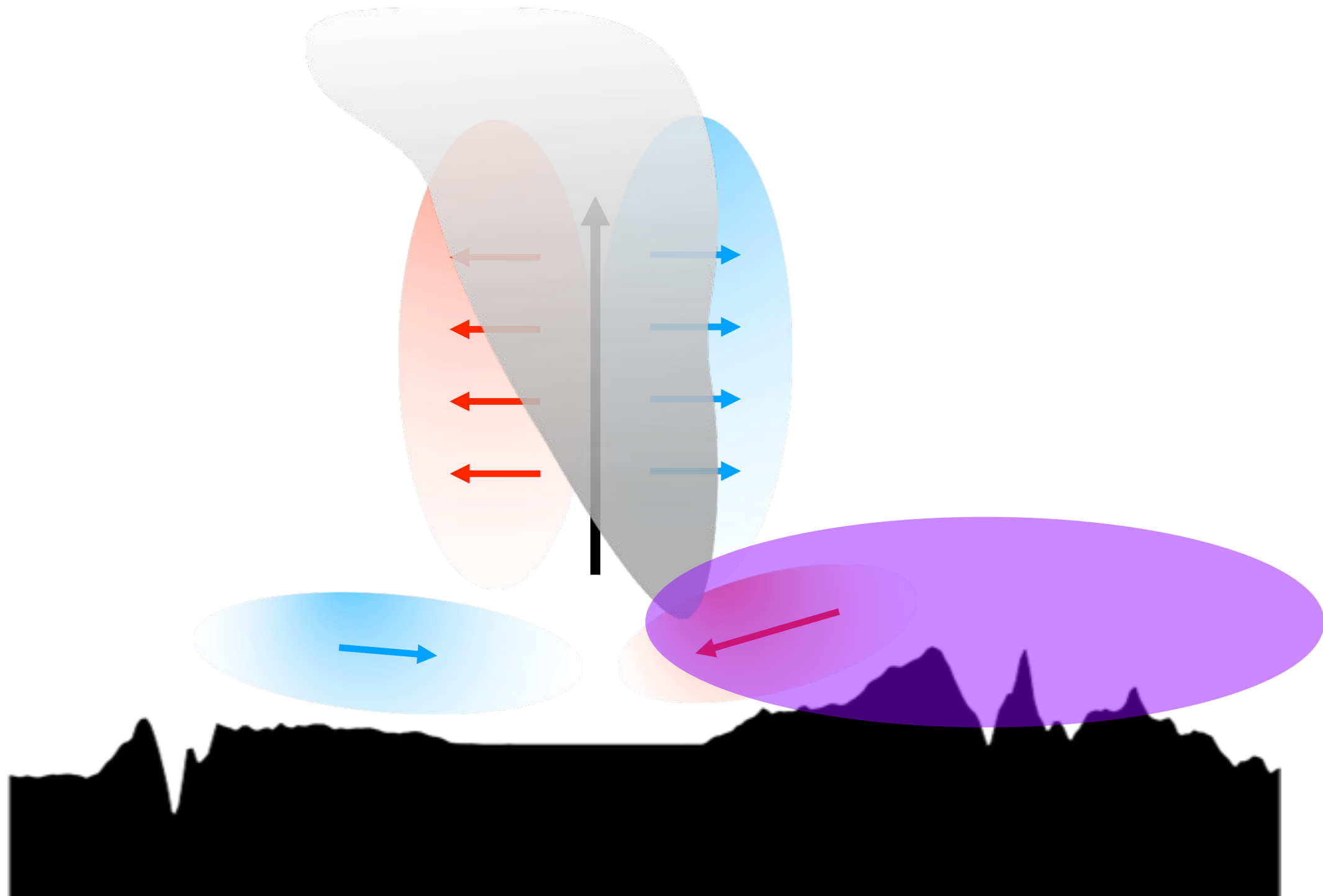


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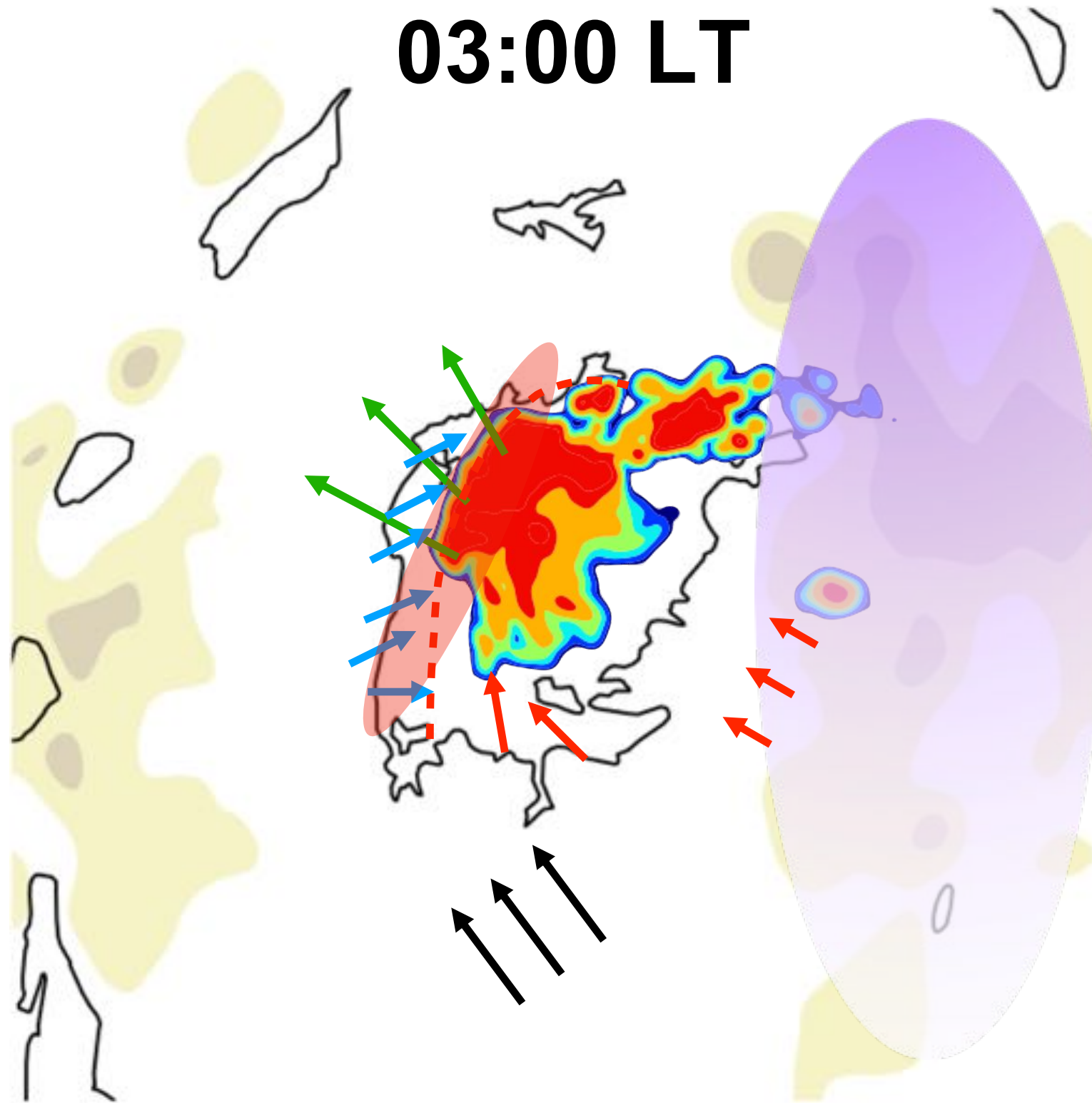
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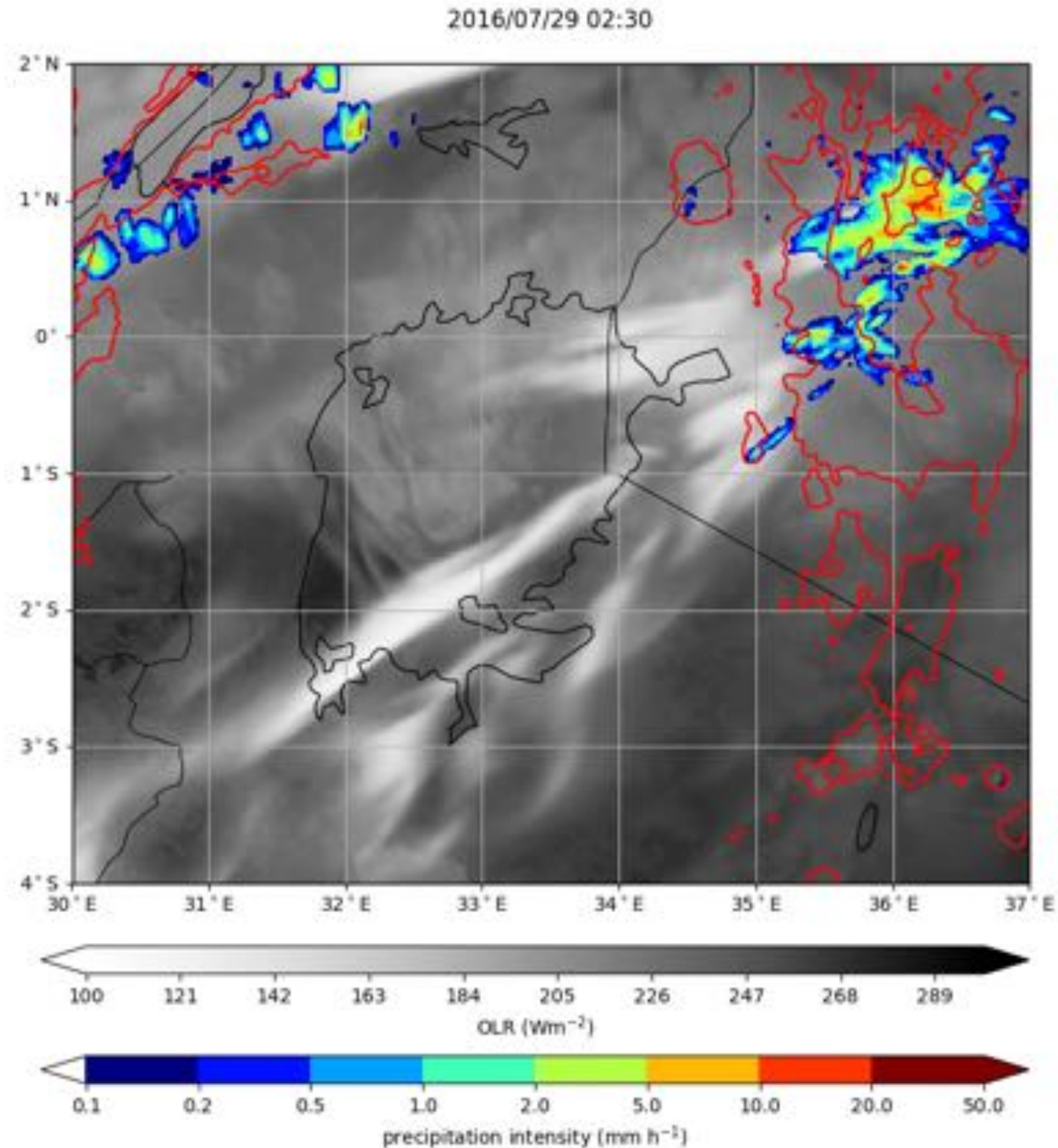
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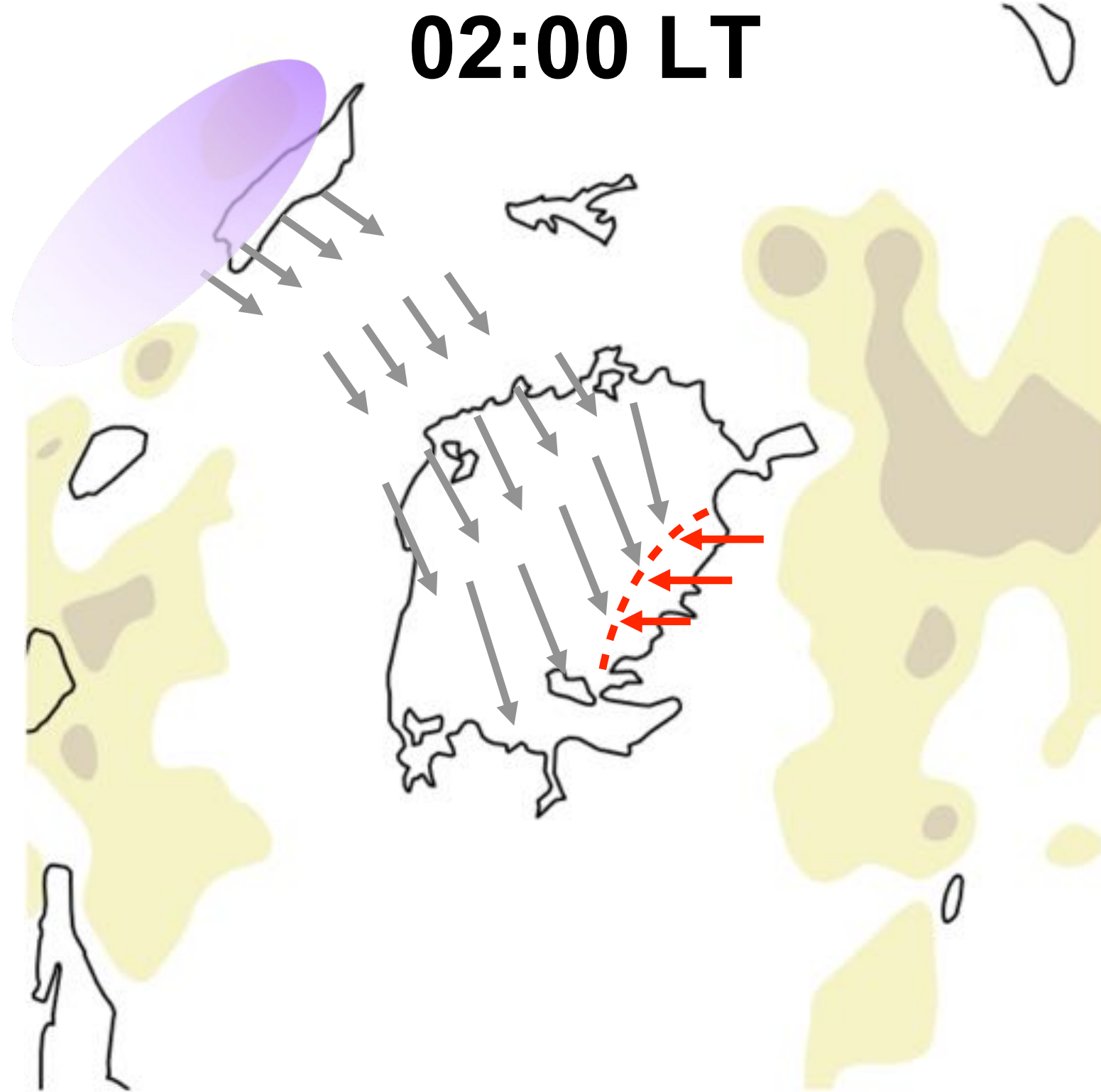
Case Study 3: Small Storm



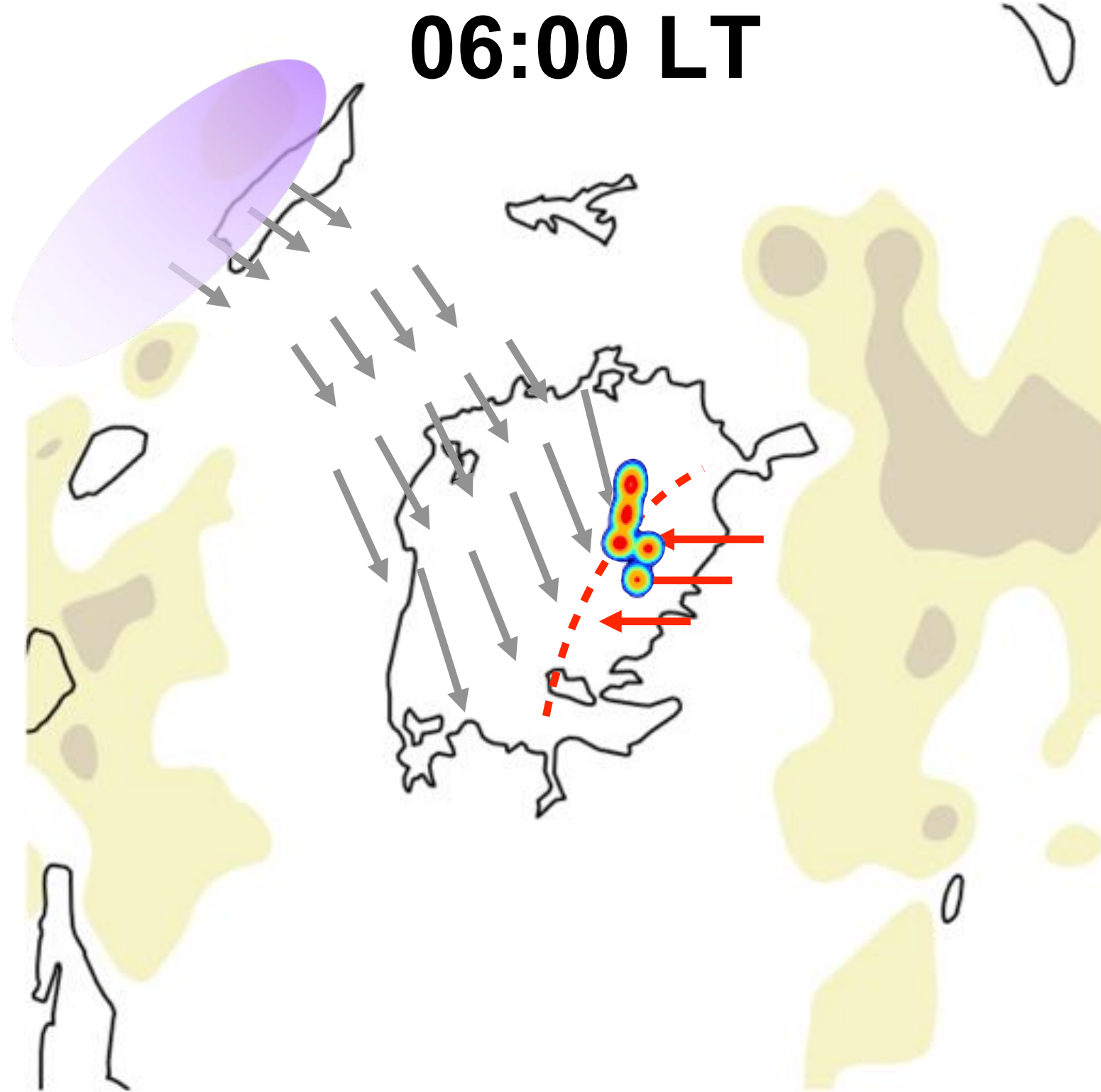
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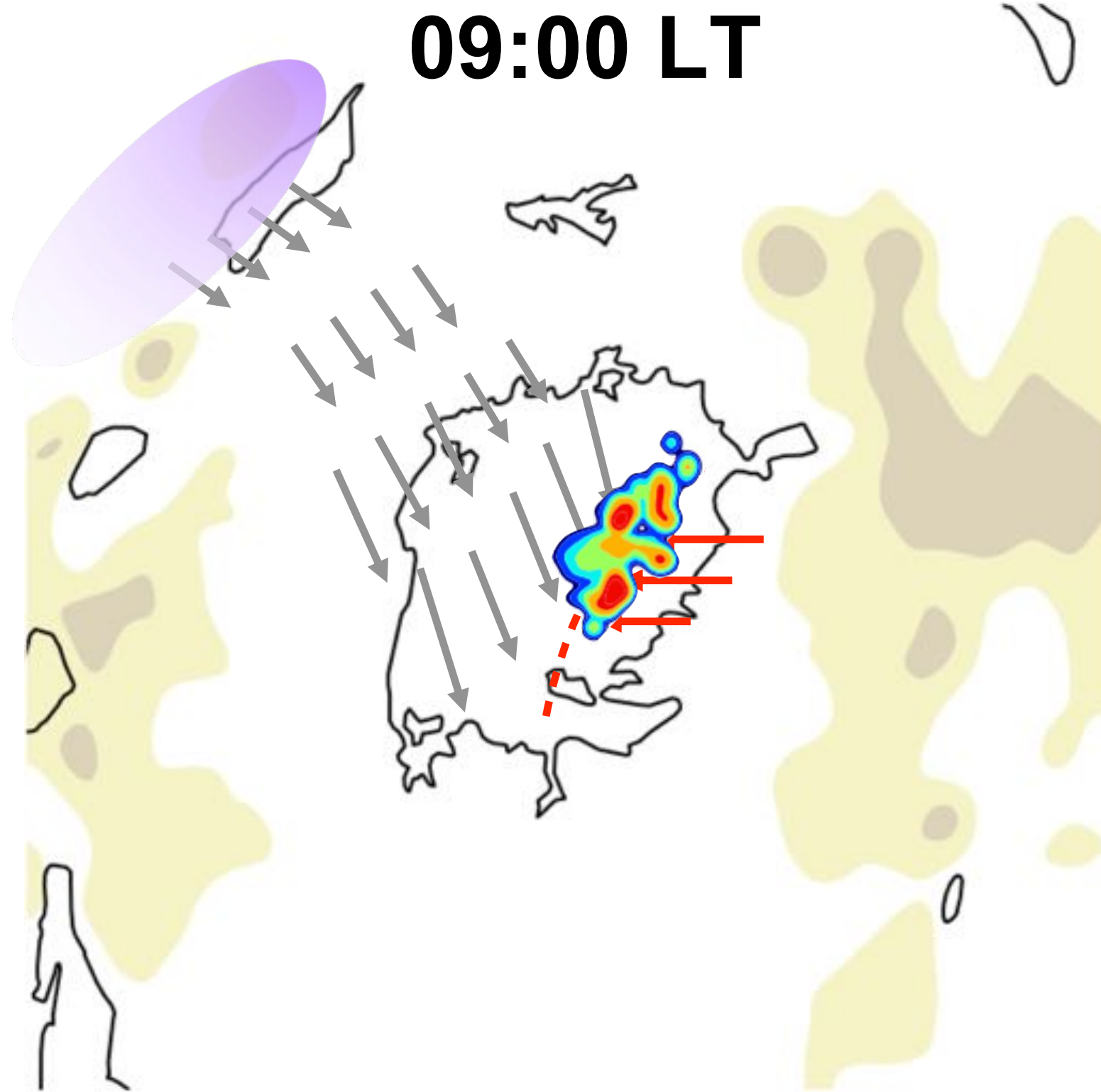
Case Study 3: Small Storm



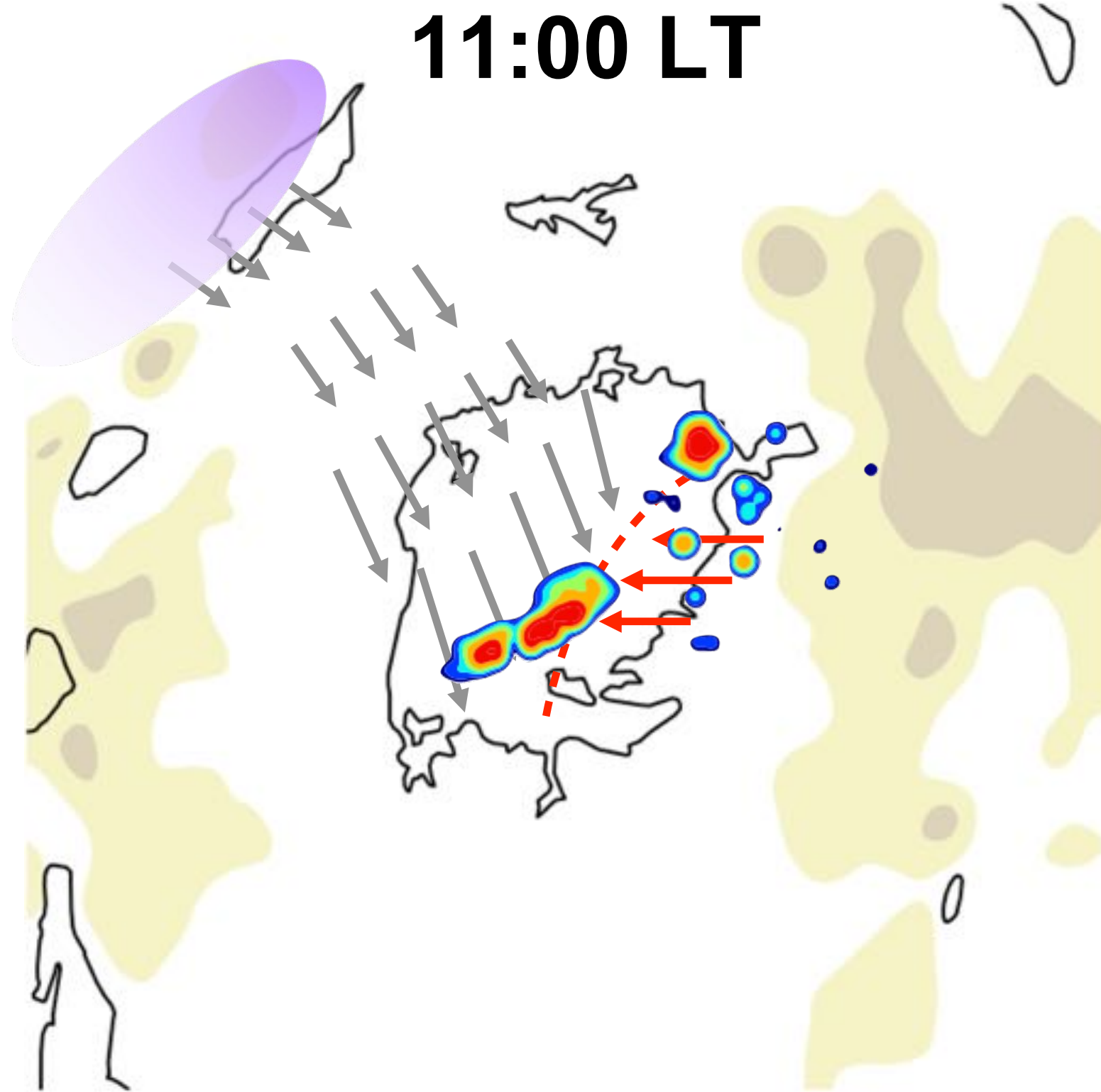
Case Study 3: Small Storm



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Lake-land Breeze Circulation

- Shows characteristics of textbook lake-land breeze circulation
- Asymmetry due to prevailing south-easterly flow and downslope flow from the eastern mountains

Large storm

- Initiates onshore as **lake-breeze front** collides with **downslope winds**
- Moves offshore with the land-breeze
- New convection is initiated on the leading edge of the storm due to the land-breeze from the western edge of the lake
- High moisture availability

Small Storm

- Initiates over the lake, where the **land-breeze** from the east meets moist **anomalous north-westerly flow**
- Storms propagate along line of convergence

Two very different storms:

Lake-land breeze circulation plays an important role in both



How representative are the two case study storms?

Using satellite observations and storm tracking, classify storms by e.g.

- location of initiation
- size
- track

Investigate correlations of storm type with factors such as

- Large-scale flow
- Time of year
- Atmospheric wave-modes
- Teleconnections

Using operational forecast model, investigate predictability of different storm types

Questions?



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Acknowledgements

Australian Bicentennial Scholarship (Menzies Centre, King's College London) and RMetS Rupert Ford Award for funding research visit to University of Melbourne