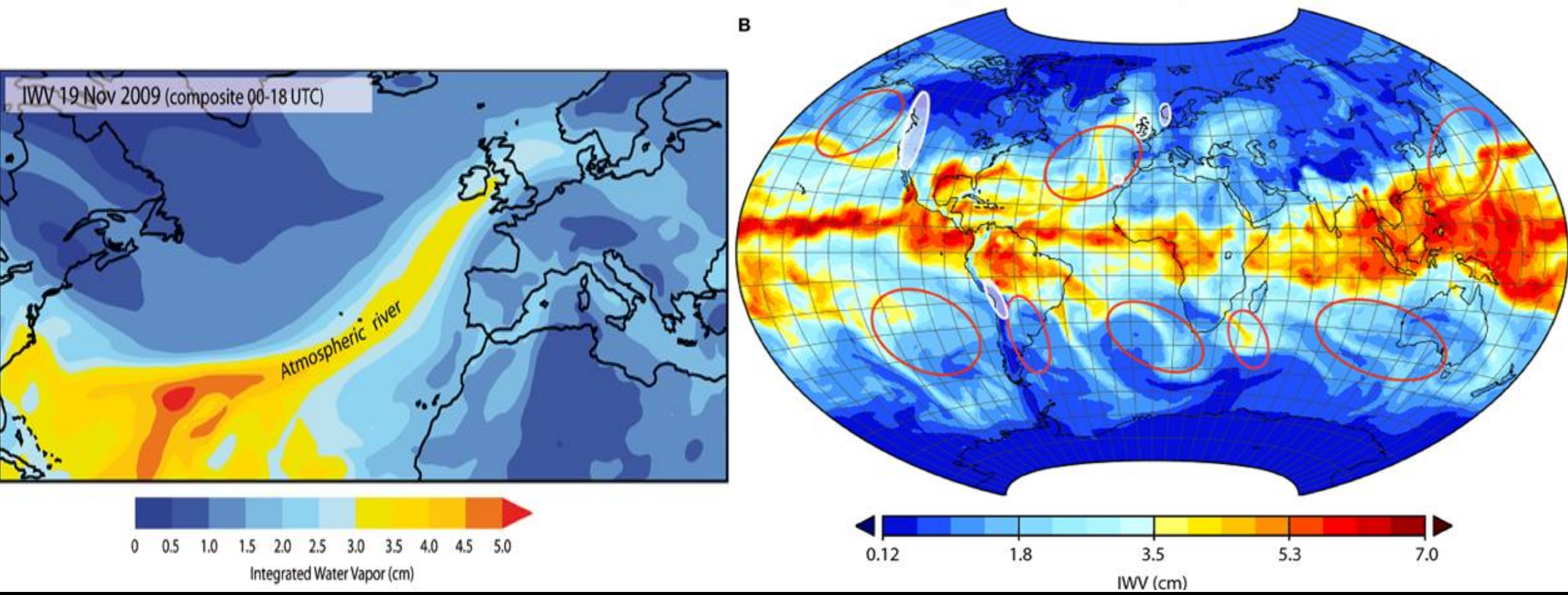
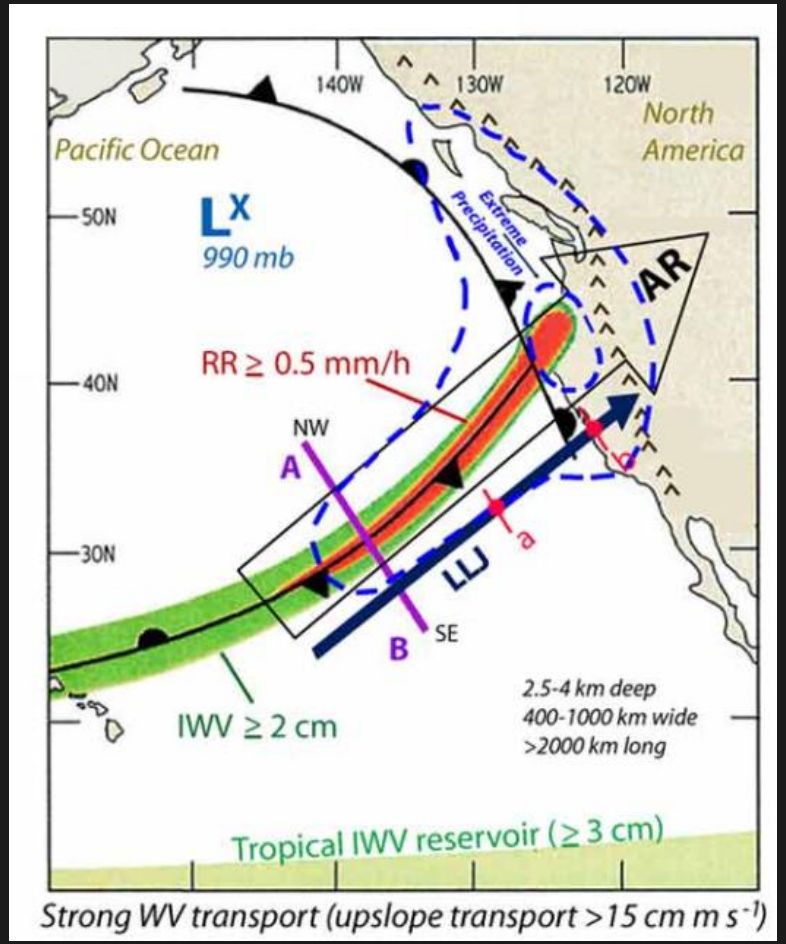


Atmospheric Rivers & Extreme Precipitation Events in Ireland

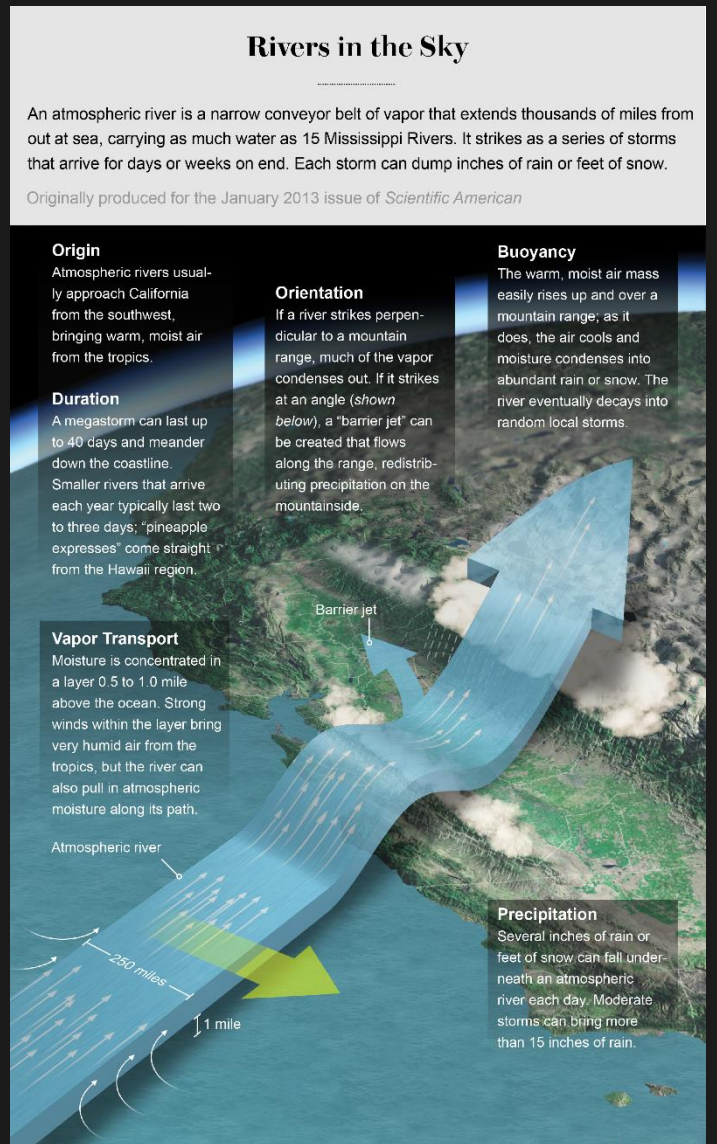
Liam Woods | School of Mathematics & Statistics | University College of Dublin

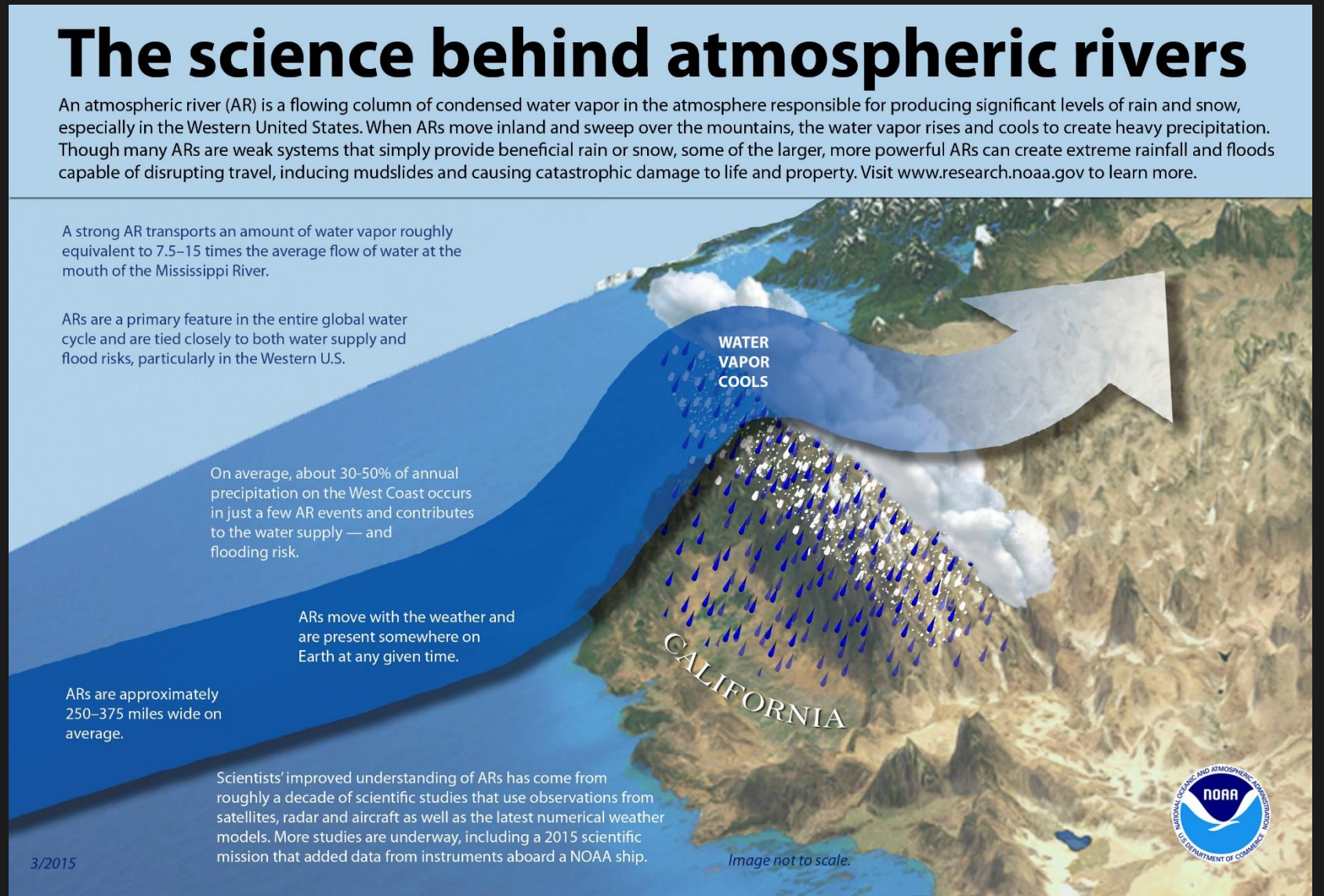
What Are Atmospheric Rivers?

- Term coined by Zhu & Newell (1998)
- “narrow corridors of water vapour transport in the lower atmosphere that traverse long swaths of the earth’s surface”
- “narrow regions responsible for the majority of the poleward water vapor transport across the mid latitudes”
- 90% of poleward water vapor transport in 4-5 narrow bands at any given time
- IWV > 2cm
- No more than 500km wide, and at least 1000km long
- Occur in the warm conveyor belt of extra-tropical cyclones



What Are Atmospheric Rivers?





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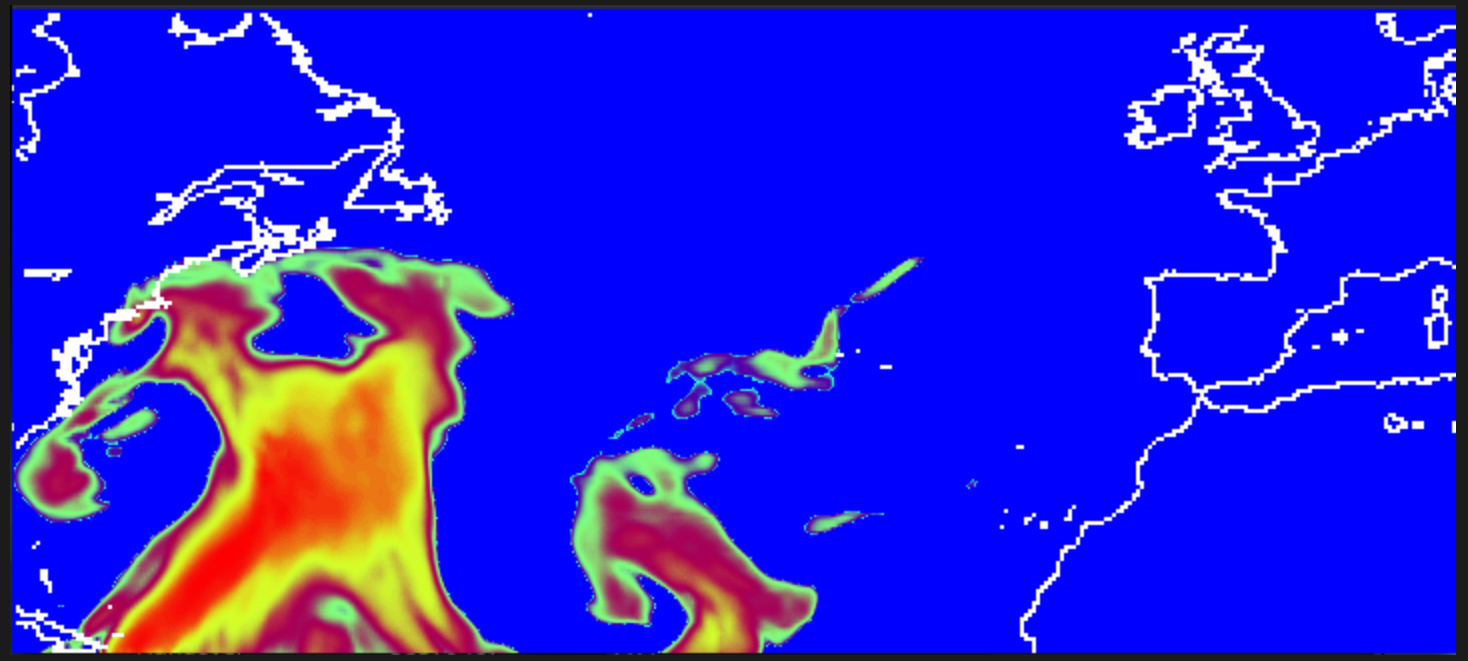

ERA5 Data – 13th Dec 1994

TCWV > 25 kg m^{-2}

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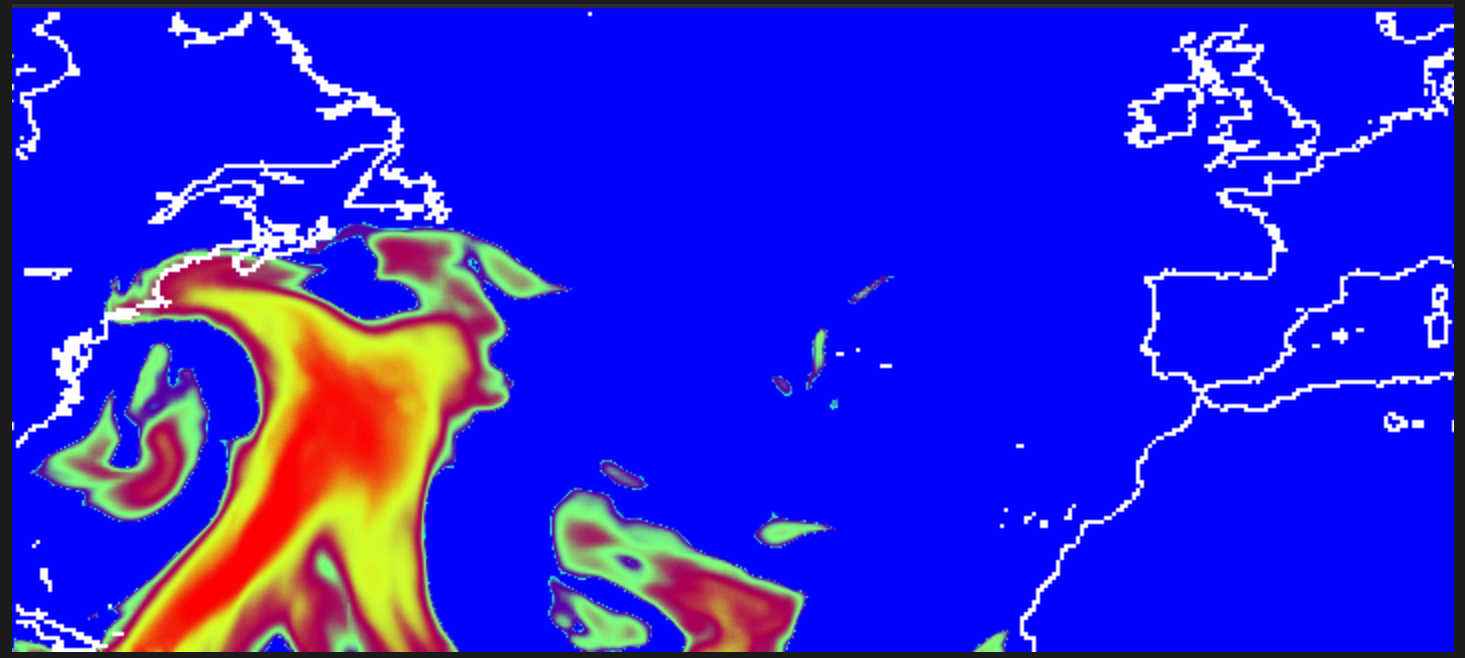

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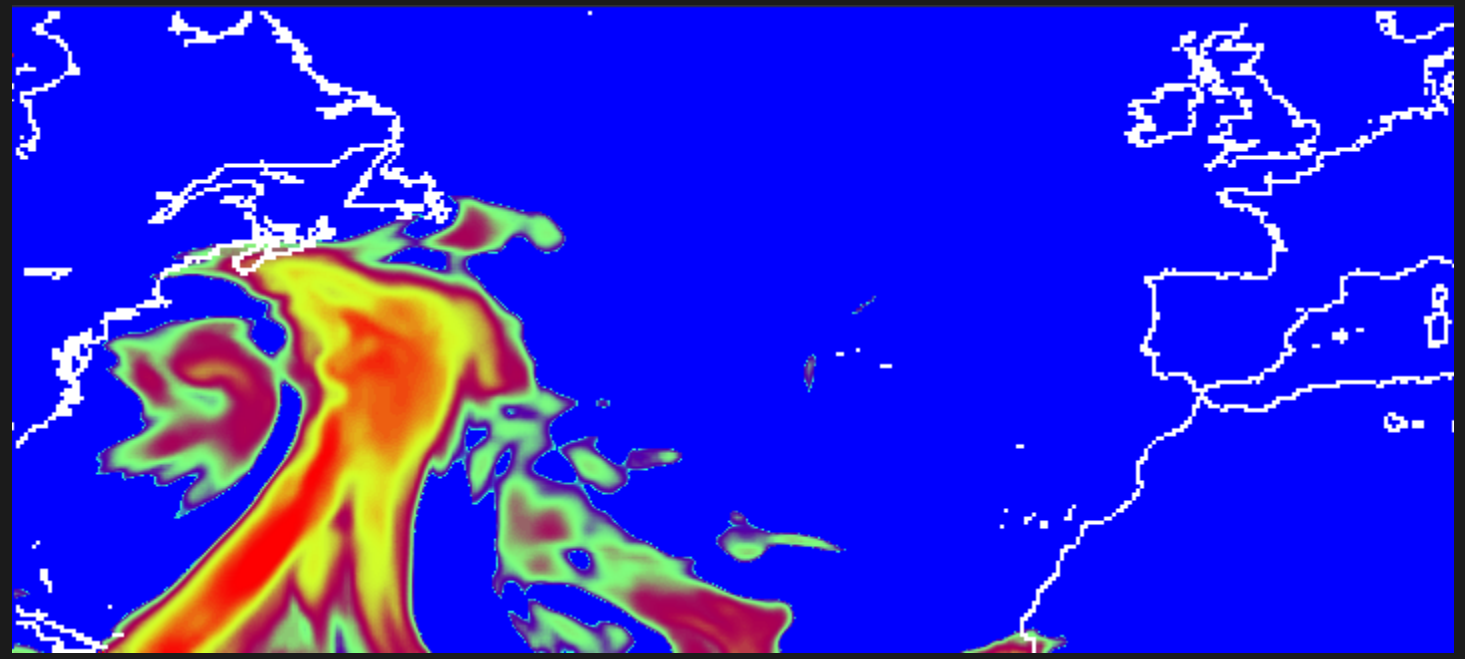

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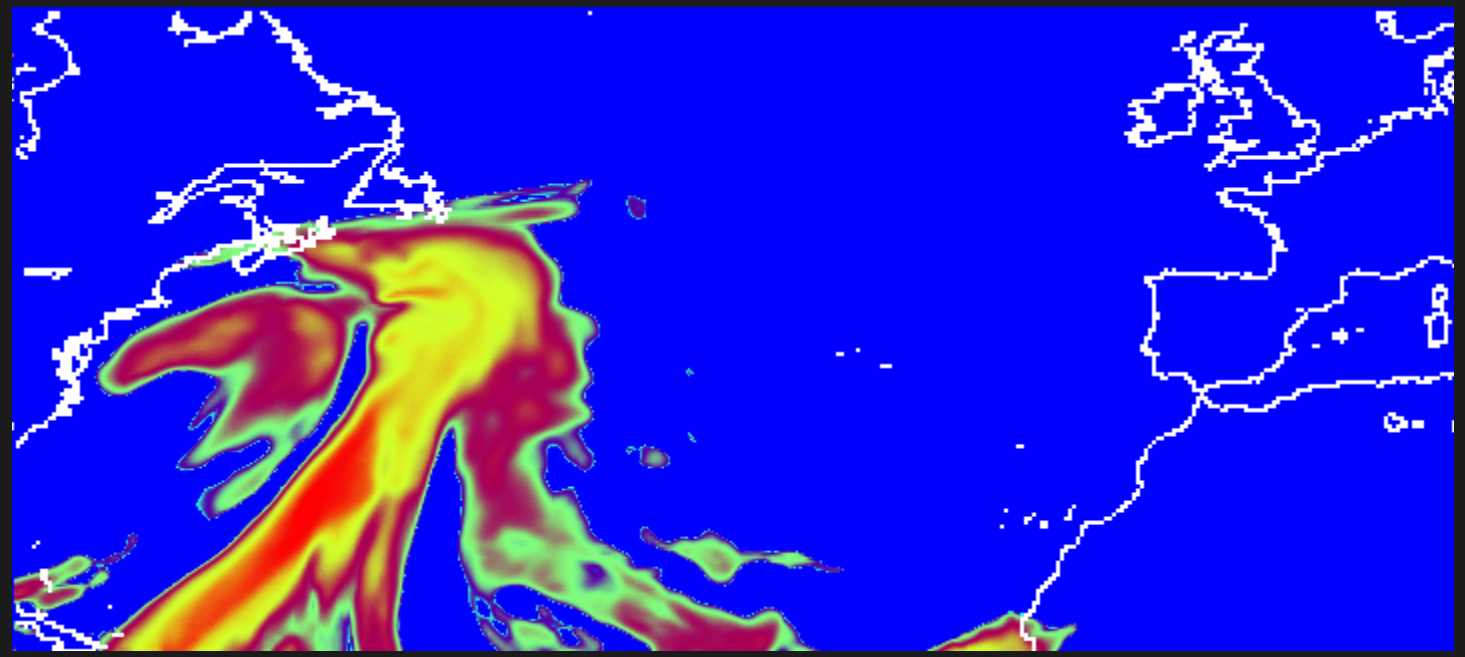

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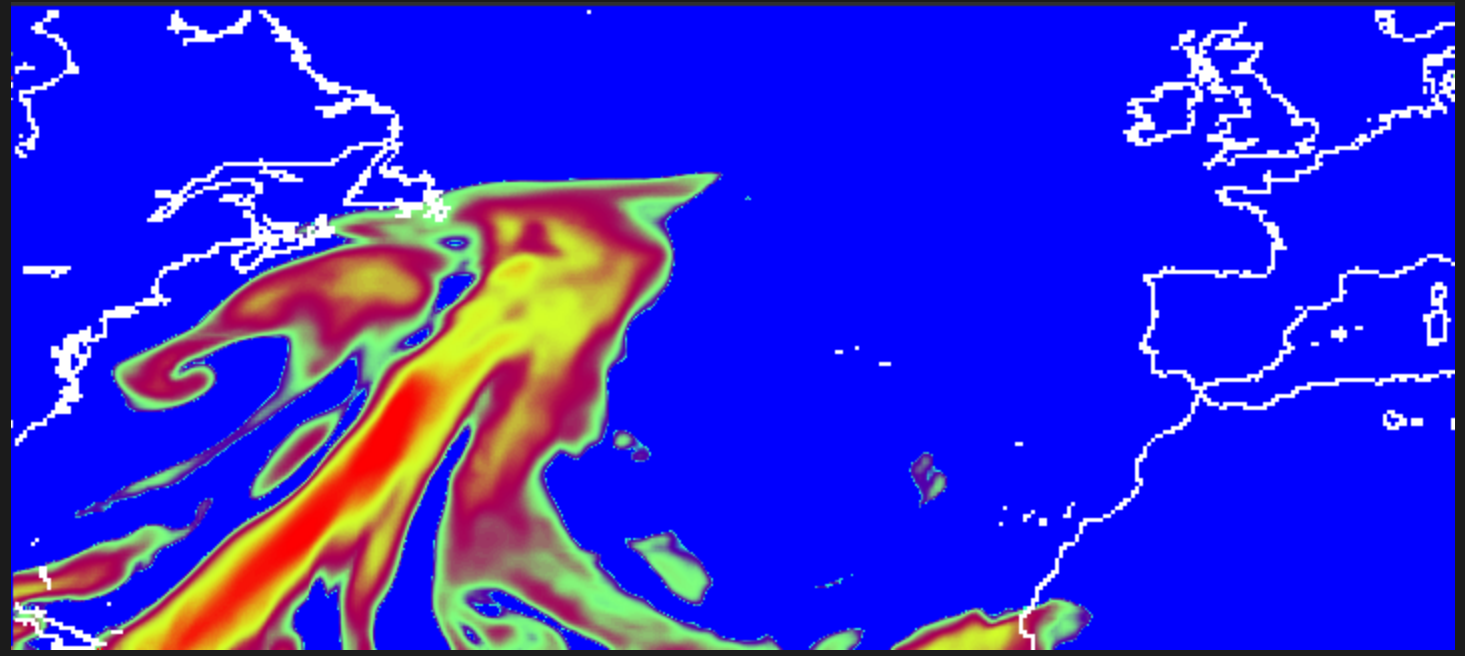

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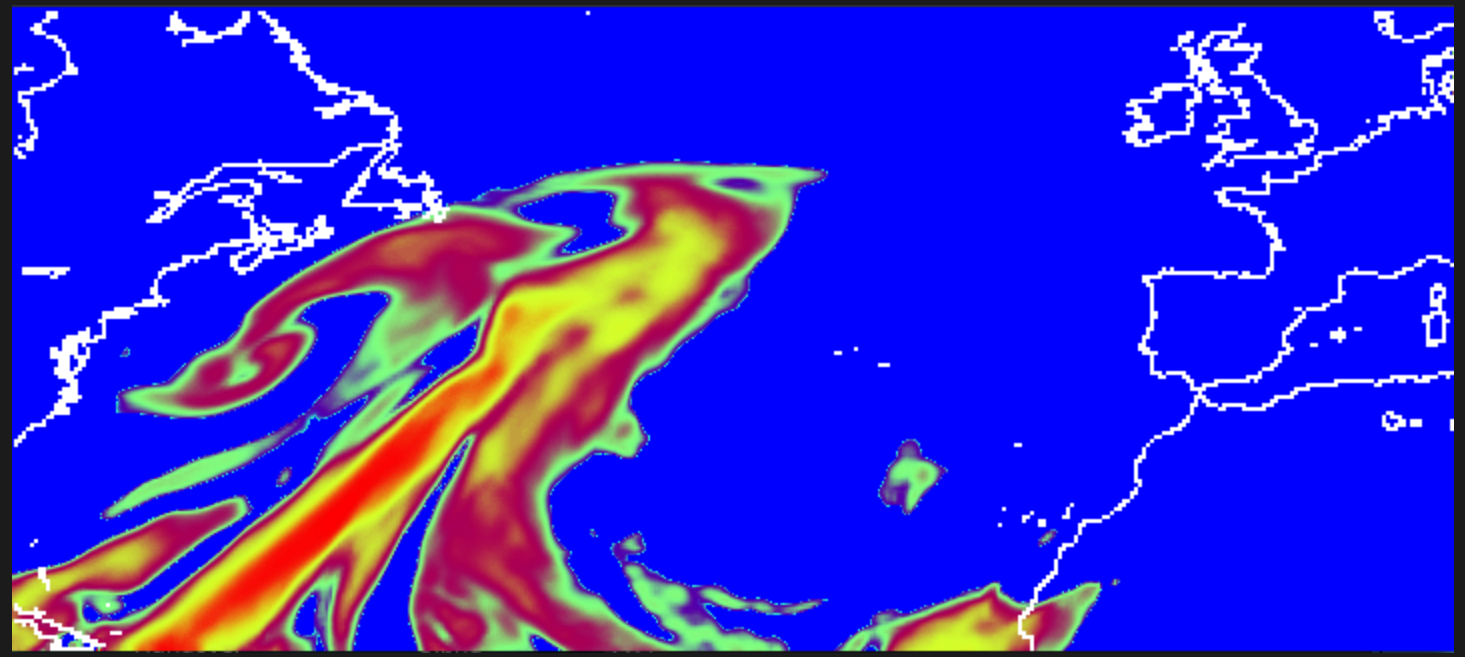

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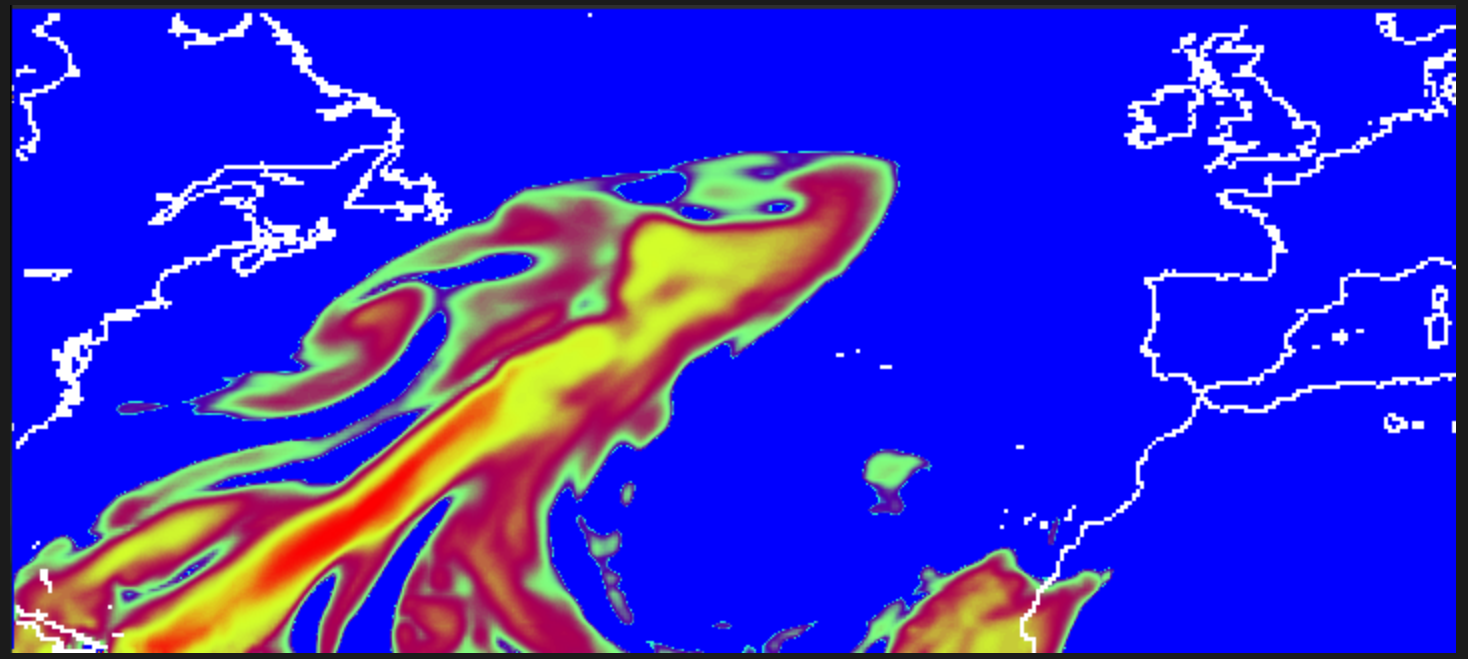

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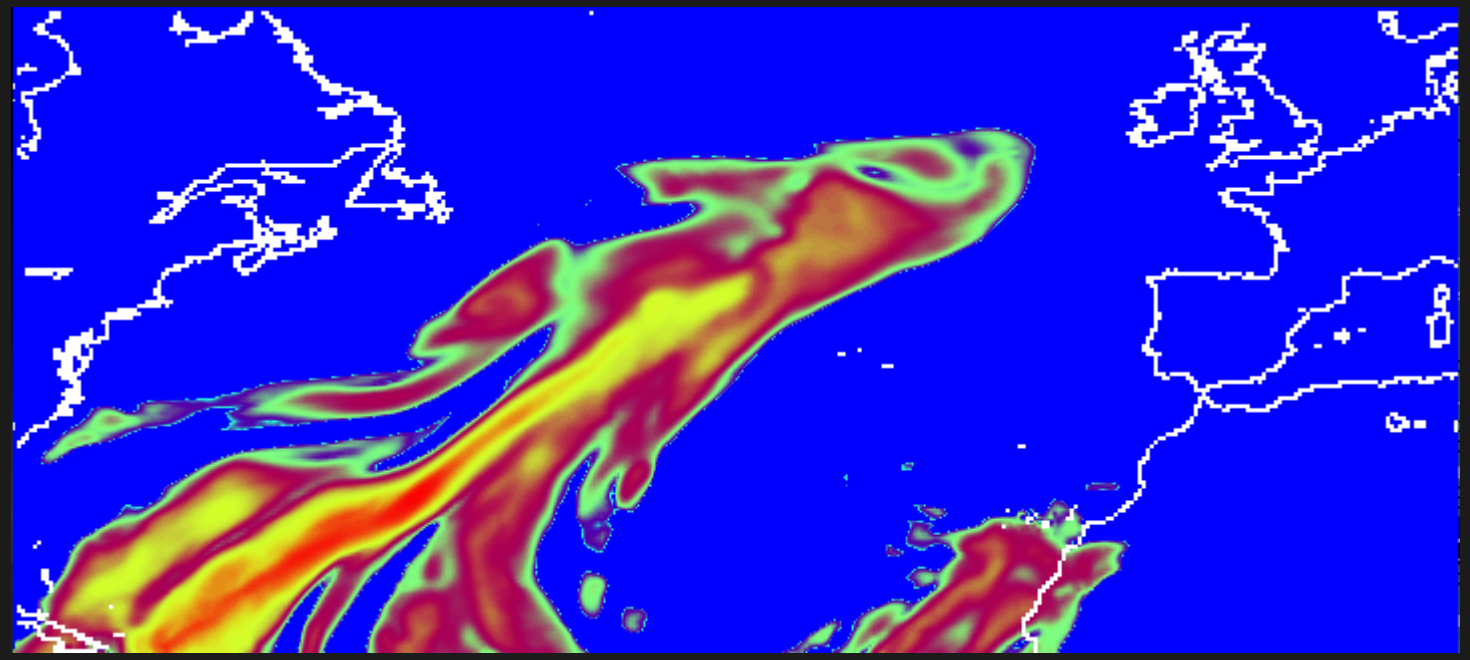

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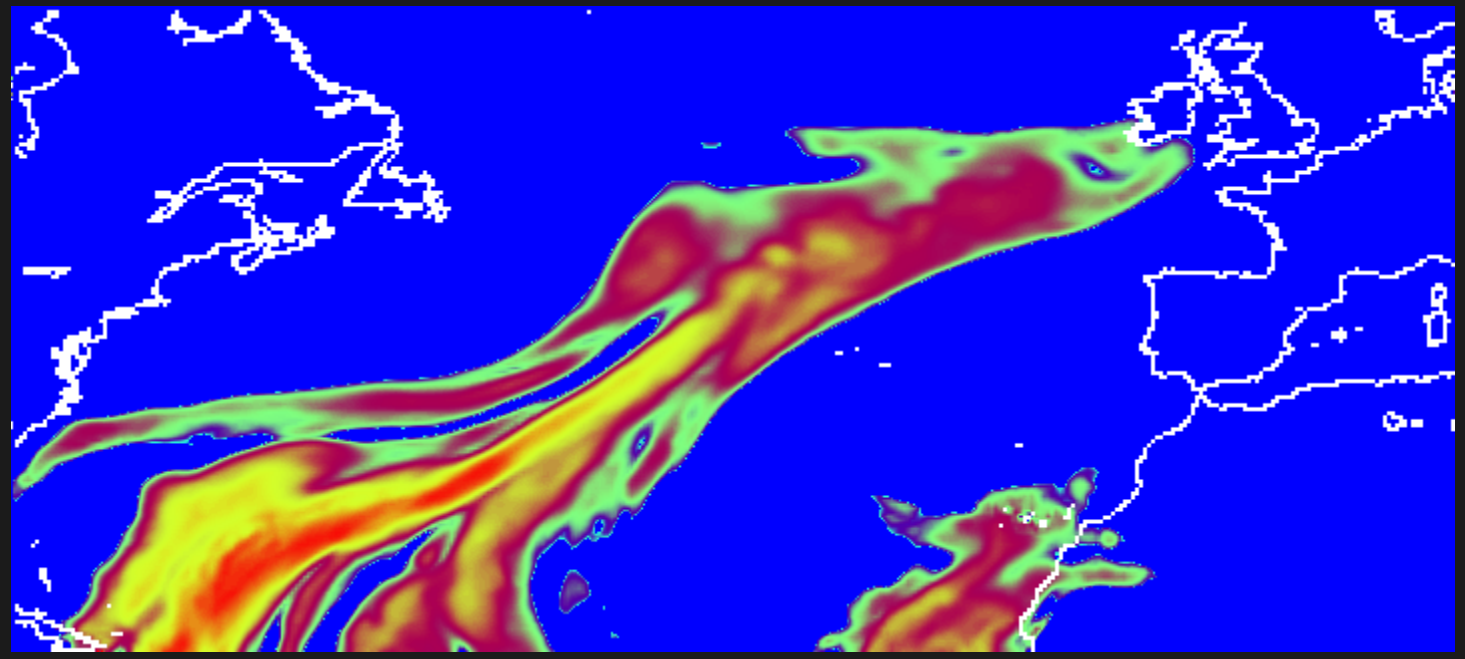

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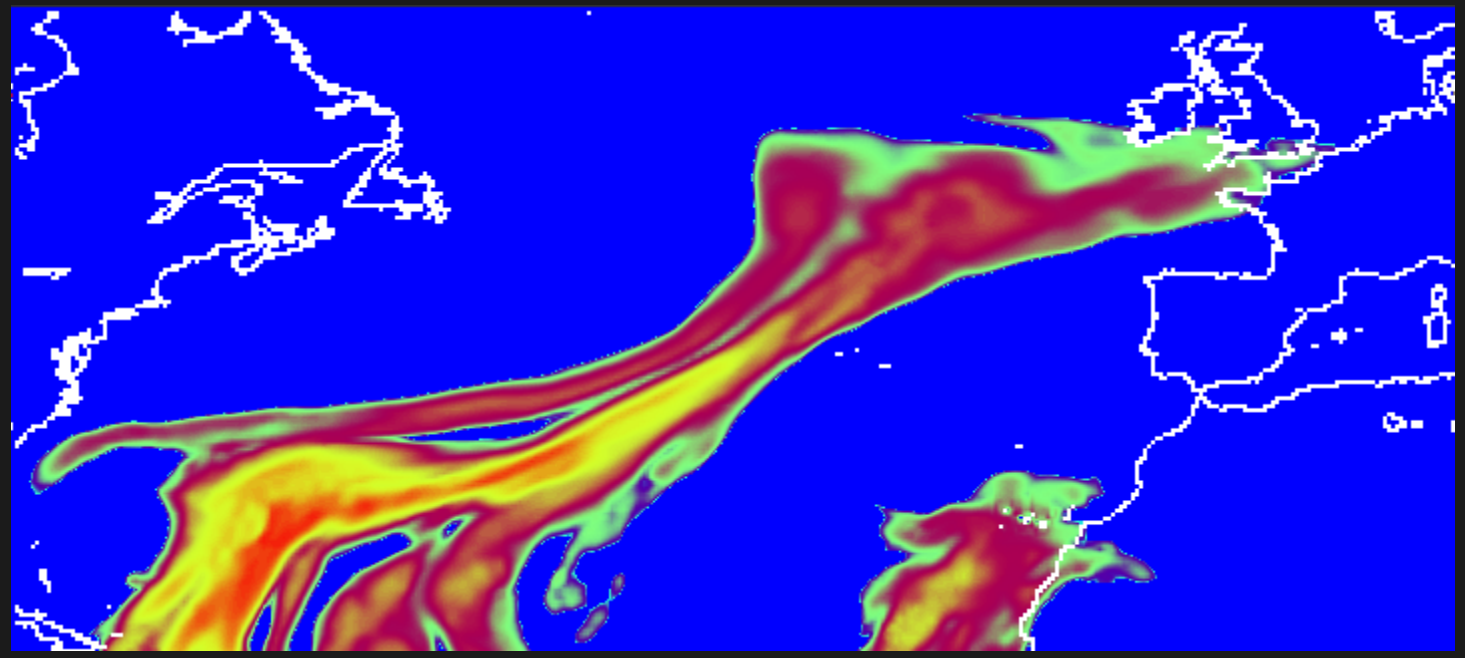

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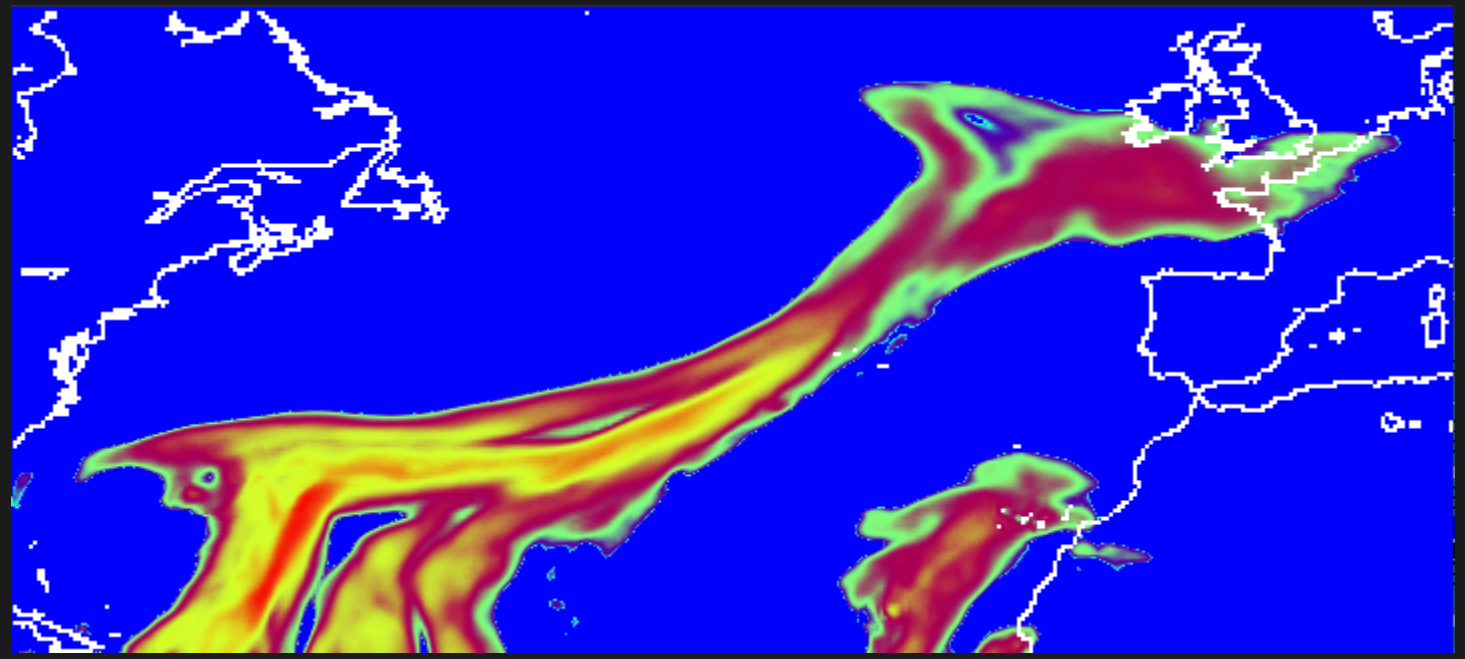

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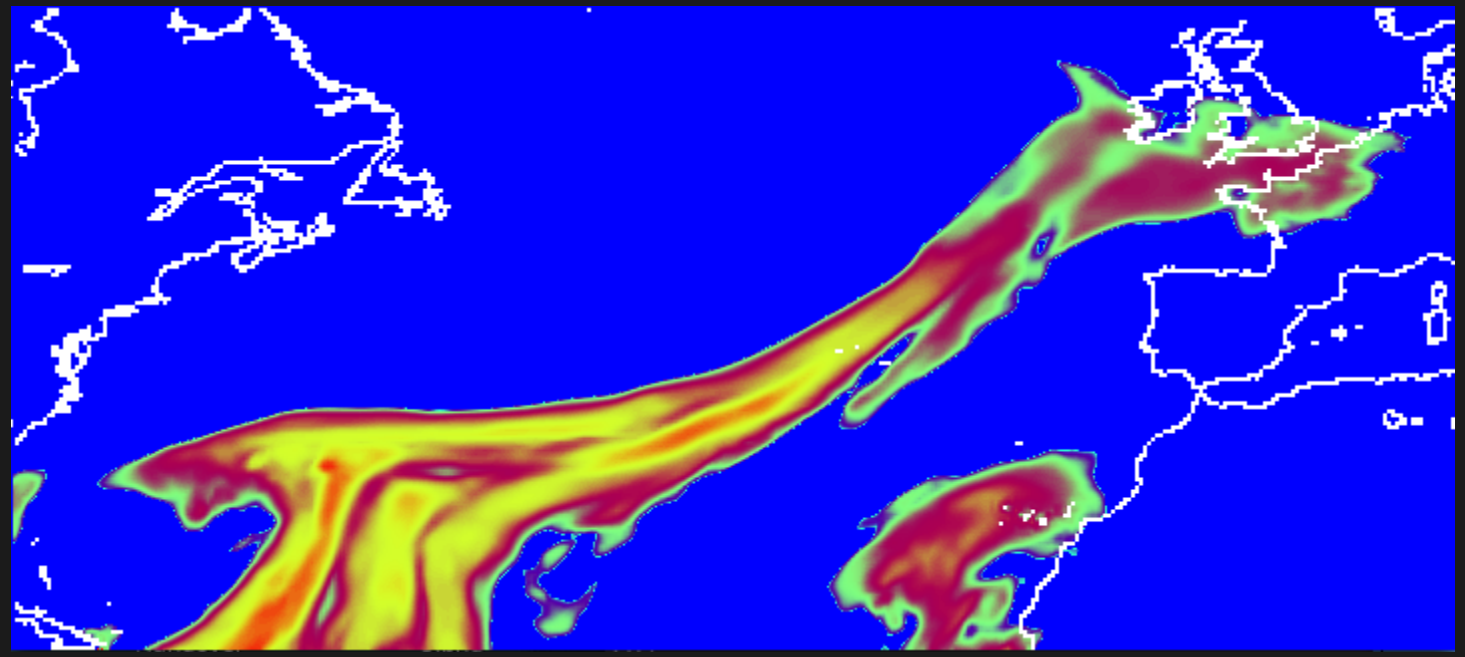

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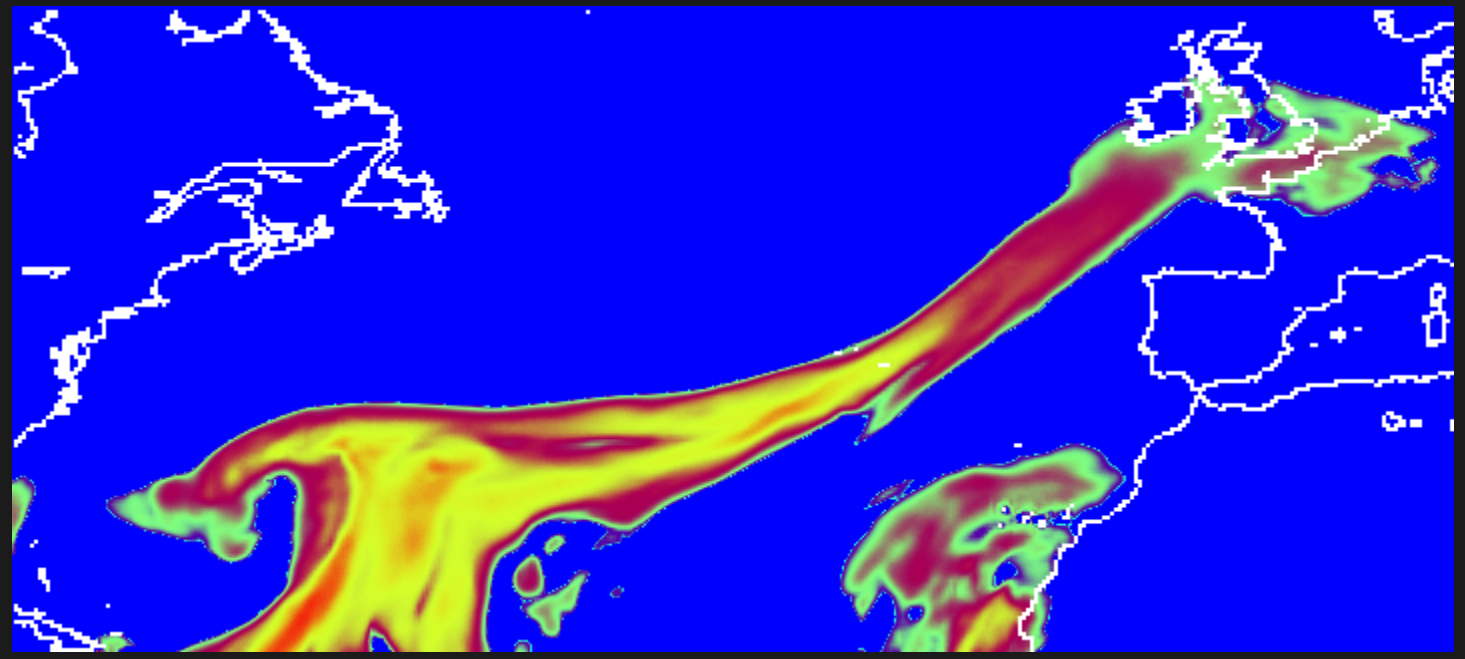

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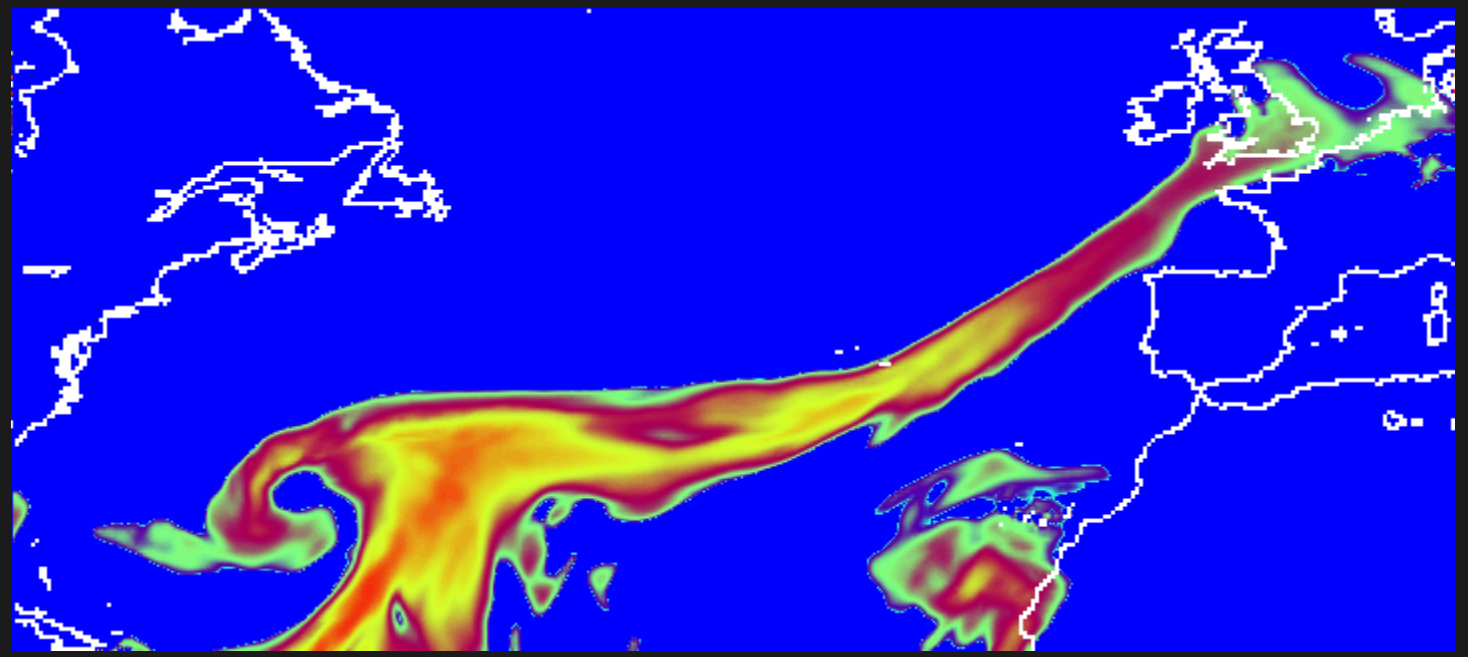

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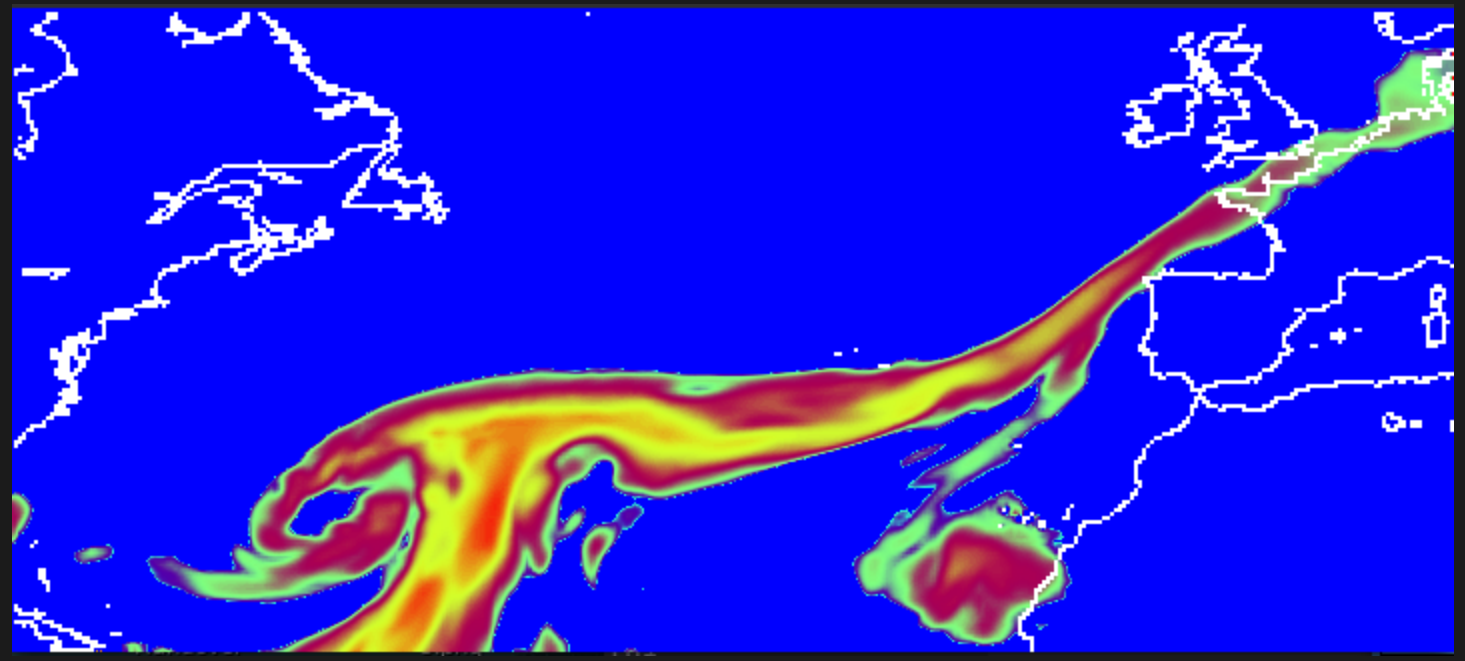

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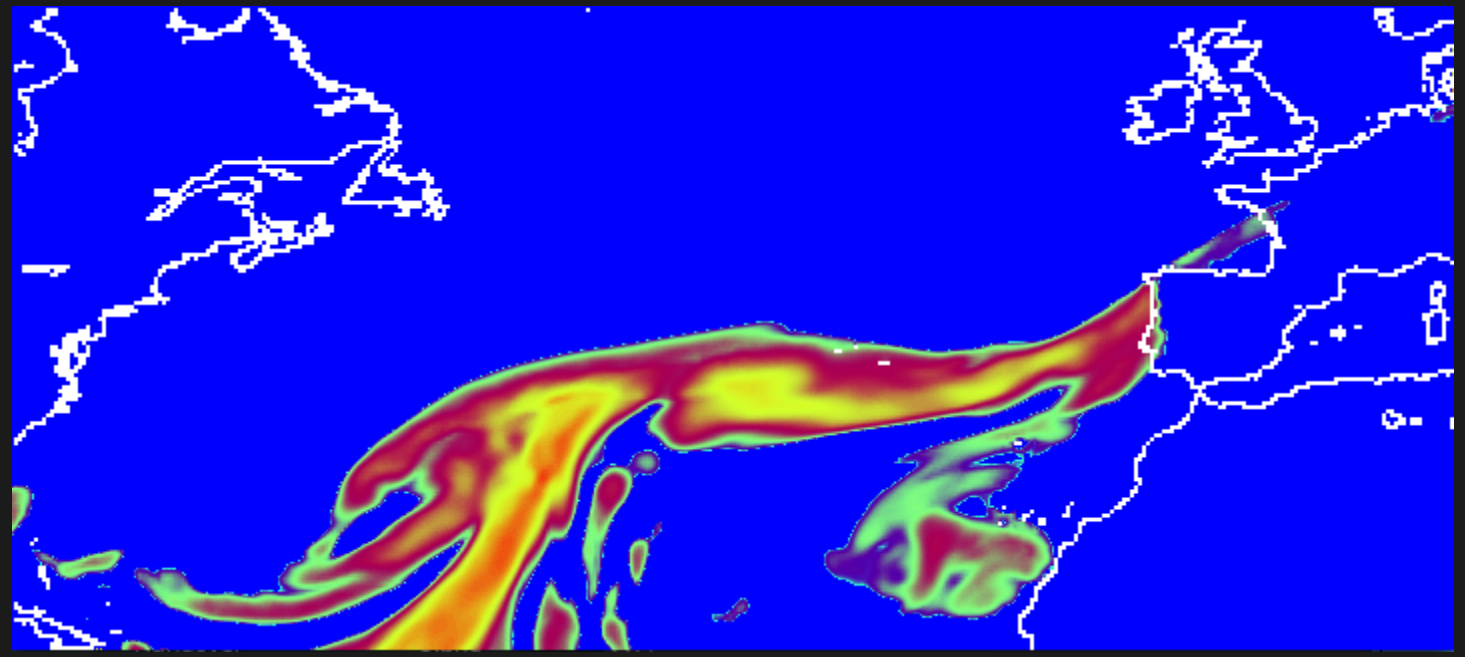

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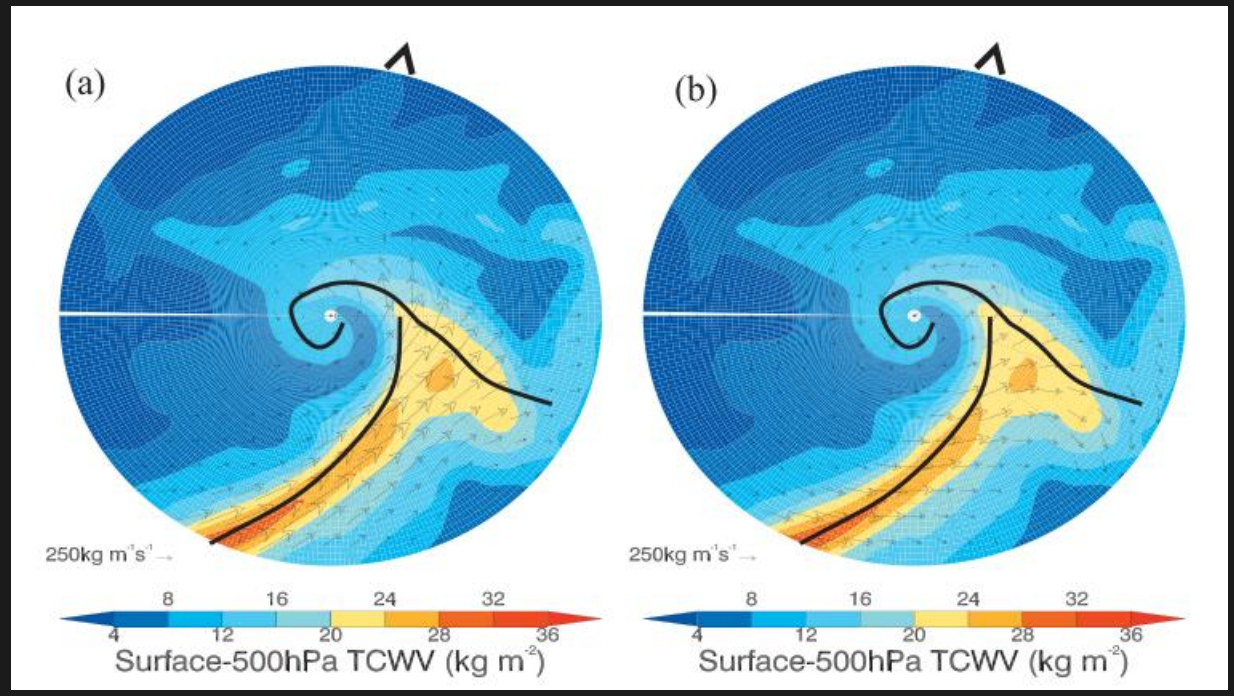
The Plan - Part 1

- Identify a significant amount of AR’s from ERA5
- MÉRA- investigate precipitation and ARs for dates identified
- Localized flooding in mountainous areas on West Coast
- Are ARs always linked with extra-tropical cyclones?

The Plan - Part 2

- Attempt to build a storm tracking algorithm
- Lagrangian approach to the problem
- Replicate results from an article from University of Reading (Dacre et al., 2015)
- Is there significant transport from the tropics?
- Is it a trail left behind by the cyclone?



Cyclone-centered water vapor transport at 0600 UTC 1 Feb 2002. Surface–500-hPa TCWV (kg m –2), is overlaid with (a) surface–500-hPa moisture flux vectors and (b) surface–500-hPa system-relative moisture flux vectors. Both panels are overlaid with frontal positions. The black arrow head shows the direction of cyclone propagation.

Any Questions?

Thanks for Listening!