DESTINATION EARTH

Data-driven modelling for On-demand Extremes

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Why AI for extremes?

- Computationally cheap solution for hectometric ensemble forecasting
- Opportunity for extensive fine-tuning and evaluation on many past events across Europe







Al-models already capable of adding value in user applications



By, 10 moh. Q ≡						I da	g 8. ok		×	
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0 Været nå						05	-	10°	0,1-1,4	2 (4) 🕊
y variet ne			i Føles	som 9°		06	-	10°	0-1,3	2 (4) 🕊
1	٥°		• 0,7 r	nm		07	-	10°	0-1,7	2 (4) 🖌
11			弐 2 (4)	m/s 🛩		08	-	10°	0,1-2,1	2 (4) 🖌
	Taball		Carl			09	-	10°	0,1-1,5	3 (4) 🕊
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	Natt		Dag	Kveld		11	-	11°	0-1	2 (3) 🐔
dag 8. okt. L3°/10°						12	-	11°	0-1,4	2 (3) +
5 mm 1 m/s	11	111	11	11		13		11°	0-0,9	1(3)
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1 m/s					_	16		12°		2 (3) 🗲
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1.7 mm	1.1	1.1	_		1	L.				

3





Our approach

- Extend ECMWF's **Anemoi framework** to on-demand forecasting
- Build on regional Al-modelling approaches (e.g. arxiv.org/pdf/2409.02891)
- Train on wide range of high-resolution datasets across Europe
- **Goal**: Provide high-resolution ensemble forecasts





Training data







Funded by the European Union Destination Earth

Training data

European reanalyses 5 km

6

Regional reanalyses 2.5 km





Training data

European reanalyses 5 km



Regional reanalyses 2.5 km



DE330 extreme event simulations 200-750m







The way forward

• AI-based forecasts will be provided in the same format as for NWP





ECMWI

Extreme weather "Ingunn" 24 hours in advance





NWP-based