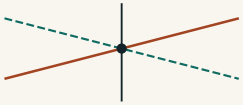
Revir

Forecasting backwards water-surface tilt days ahead at the next SWOT pass

(a) From Water Heights to Forecast Inputs

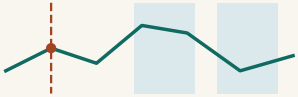
Point Gauge



One pier height

Two possible tilts

Nadir Track and SWOT Swath



Nadir samples one spot

KaRIn spans 120 km

Discharge Filter

$$Q \propto \sqrt{S}$$

$S < 0$

Backwards pass

dropped from input

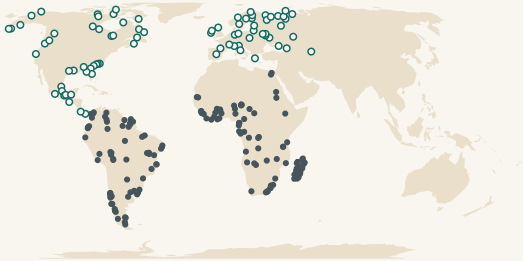
Time-Aware Forecast



OpenTSLM +

PhysicalTimeRoPE

Continental Transfer



160 training in 2023

80 unseen in 2024

Backwards Tilts by Distance from Coast

Negative tilt at 95 of 320 stretches



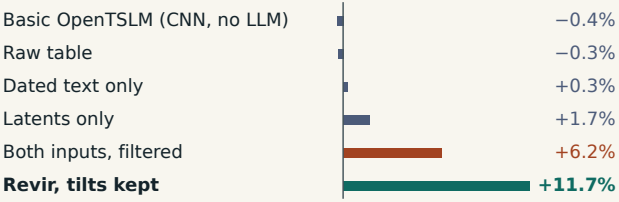
0 50 km 800 km tide 1,443 km

24 within 50 km · 71 of 95 farther inland

(b) Held-Out Forecast Performance

Model and Tokenizer Comparison

Probability accuracy (Brier skill vs 2023 rate)



Warnings Confirmed (Top Fifth)

	Kept	Filtered	Basic CNN
Revir · 109 warnings	51	23	30
Coastal · 30 warnings	20	5	8
Strong tilt · hydraulic trees	18	1	
Strong tilt · trees, full test	103	59	
Terminal CD 1870 · coastal	13	21	

3 of 5 paired families improved Brier error with signed data