

Table 14. Performance comparison with baselines on ERA5.

MODEL	TEMPERATURE		WIND U	WIND V	VELOCITY
	L1	L2			
UNET	7.21E-02	8.31E-02	7.60E-02	2.32E-01	7.55E-01
FNO	3.04E-03	4.06E-03	1.13E-01	3.88E-01	7.85E-01
MGNO	9.76E-01	9.76E-01	1.83E-01	2.43E-01	7.79E-01
MWT	3.63E-03	5.28E-03	1.19E-01	3.72E-01	7.87E-01
LSM	2.80E-03	4.16E-03	9.55E-02	2.43E-01	7.55E-01
TRANSOLVER	3.06E-03	4.41E-03	9.90E-02	2.42E-01	7.87E-01
<b>M2NO</b>	<b>1.85E-03</b>	<b>2.77E-03</b>	<b>6.29E-02</b>	<b>1.98E-01</b>	<b>6.25E-01</b>
PROMOTION	33.92%	31.69%	17.26%	14.60%	17.18%

Table 15. Super-resolution benchmarks on ERA5 dataset, showing  $L_2$  loss at various resolutions following training at  $s = (32 \times 32)$ 

MODEL	64×64	128×128	256×256	512×512
FNO	1.77E-01	3.20E-01	3.29E-01	3.33E-01
MWT	2.86E-01	3.39E-01	5.00E-01	6.64E-01
LSM	2.74E-02	4.69E-02	6.17E-02	6.84E-02
<b>M2NO</b>	<b>1.72E-02</b>	<b>2.28E-02</b>	<b>2.52E-02</b>	<b>2.63E-02</b>
PROMOTION	37.10%	51.42%	59.14%	61.52%

Table 16. Benchmarks on ERA5 dataset at various resolutions.

MODEL	32×32	64×64	128×128	256×256	512×512
UNET	1.33E-01	9.85E-02	8.94E-02	8.54E-02	8.31E-02
FNO	4.28E-03	4.10E-03	4.23E-03	4.14E-03	4.06E-03
MGNO	1.52E-02	5.24E-01	9.01E-01	9.76E-01	9.76E-01
MWT	8.09E-03	5.46E-03	5.05E-03	5.04E-03	5.28E-03
LSM	4.89E-03	3.97E-03	4.42E-03	4.82E-03	4.16E-03
TRANSOLVER	4.03E-03	3.95E-03	4.03E-03	3.85E-03	4.41E-03
<b>M2NO</b>	<b>3.73E-03</b>	<b>3.68E-03</b>	<b>3.24E-03</b>	<b>2.88E-03</b>	<b>2.77E-03</b>
PROMOTION	7.59%	6.64%	19.54%	25.11%	31.69%