

IFS Cycle 46r1 scorecards

- HRES
- ENS

Comparison of scores of IFS Cycle 46r1 (combination of research experiments and the current test suite) and IFS Cycle 45r1 (the current operational cycle) verified by the respective analyses or in-situ observations (TEMP, SYNOP, BUOY) at 00 and 12UTC in the period 1 June 2017 to 14 May 2019 (in total 645 high-resolution and 312 ensemble forecast runs).

Each symbol in a cell represents 1 forecast day, i.e 10 days for HRES and 15 days for ENS.

HRES

			Extratropical Northern Hemisphere		Extratropical Southern Hemisphere		Tropics	
			Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error (*)	Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error (*)	Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error (*)
Analysis	Geopotential	100						
		250						
		500						
		850						
	Mean sea level pressure							
	Temperature	100						
		250						
		500						
		850						
		1000						
	2m temperature							
	Wind	100						
		250						
		500						
		850						
		1000						
	10m wind							
	Relative humidity	250						
		700						
	10m wind at sea							
	Significant wave height			(*)		(*)		(*)
	Mean wave period			(*)		(*)		(*)
Observations	Geopotential	100						
		250						
		500						
		850						

	Temperature	100					
		250					
		500					
		850					
	2m temperature						
	Wind	100					
		250					
		500					
		850					
	10m wind						
	Relative humidity	250					
		700					
	2m dew-point						
	Total cloud cover						
	24h precipitation		(*)		(*)		(*)

			Europe		Northern America		East Asia	
			Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error (*)	Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error (*)	Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error (*)
Analysis	Geopotential	100						
		250						
		500						
		850						
	Mean sea level pressure							
	Temperature	100						
		250						
		500						
		850						
		1000						
	2m temperature							
	Wind	100						
		250						
		500						
		850						
		1000						
	10m wind							
	Relative humidity	250						
		700						
Observations	Geopotential	100						

		250					
		500					
		850					
Temperature	100						
	250						
	500						
	850						
2m temperature							
Wind	100						
	250						
	500						
	850						
10m wind							
Relative humidity	250						
	700						
2m dew-point							
Total cloud cover							
24h precipitation		(*)		(*)		(*)	

			Northern Atlantic		Northern Pacific	
			Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error(*)	Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error(*)
Analysis	Geopotential	100				
		250				
		500				
		850				
	Mean sea level pressure					
	Temperature	100				
		250				
		500				
		850				
		1000				
	2m temperature					
	Wind	100				
		250				
		500				
		850				
		1000				

	10m wind					
	Relative humidity	250				
		700				
	10m wind at sea					
	Significant wave height			(*)		(*)
	Mean wave period			(*)		(*)

			Arctic		Antarctic	
			Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error(*)	Anomaly correlation/ SEEPS(*)	RMS error/ Std. dev.of error(*)
Analysis	Geopotential	100				
		250				
		500				
		850				
	Mean sea level pressure					
	Temperature	100				
		250				
		500				
		850				
		1000				
	2m temperature					
	Wind	100				
		250				
		500				
		850				
		1000				
	10m wind					
	Relative humidity	250				
		700				
Observations	Geopotential	100				
		250				
		500				
		850				
	Temperature	100				
		250				
		500				
		850				

2m temperature					
Wind	100				
	250				
	500				
	850				
10m wind					
Relative humidity	250				
	700				
2m dew-point					
Total cloud cover					
24h precipitation		(*)		(*)	

ENS

			Extratropical Northern Hemisphere		Extratropical Southern Hemisphere		Tropics	
			EM RMS error	CRPS	EM RMS error	CRPS	EM RMS error	CRPS
Analysis	Geopotential	100						
		250						
		500						
		850						
	Mean sea level pressure							
	Temperature	100						
		250						
		500						
		850						
	Wind speed	100						
		250						
		500						
		850						
	Relative humidity	200						
		700						
	2m temperature							
	10m wind at sea							
	Significant wave height							
	Mean wave period							
Observations	Geopotential	100						

		250						
		500						
		850						
	Temperature	100						
		250						
		500						
		850						
	Wind speed	100						
		250						
		500						
		850						
	Relative humidity	200						
		700						
	2m temperature							
	2m dew-point							
	Total cloud cover							
	10m wind							
	24h precipitation							

			Europe		Northern America		East Asia	
			EM RMS error	CRPS	EM RMS error	CRPS	EM RMS error	CRPS
Analysis	Geopotential	100						
		250						
		500						
		850						
	Mean sea level pressure							
	Temperature	100						
		250						
		500						
		850						
	Wind speed	100						
		250						
		500						
		850						
	Relative humidity	200						
		700						
	2m temperature							
Observations	Geopotential	100						
		250						

		500						
		850						
	Temperature	100						
		250						
		500						
		850						
	Wind speed	100						
		250						
		500						
		850						
	Relative humidity	200						
		700						
	2m temperature							
	2m dew-point							
	Total cloud cover							
	10m wind							
	24h precipitation							

			Arctic		Antarctic	
			EM RMS error	CRPS	EM RMS error	CRPS
Analysis	Geopotential	100				
		250				
		500				
		850				
	Mean sea level pressure					
	Temperature	100				
		250				
		500				
		850				
	Wind speed	100				
		250				
		500				
		850				
	Relative humidity	200				
		700				
	2m temperature					
Observations	Geopotential	100				

		250				
		500				
		850				
	Temperature	100				
		250				
		500				
		850				
	Wind speed	100				
		250				
		500				
		850				
	Relative humidity	200				
		700				
	2m temperature					
	2m dew-point					
	Total cloud cover					
	10m wind					
	24h precipitation					

Symbol legend: for a given forecast step...

46r1 **better** than 45r1 statistically **significant with 99.7% confidence**

46r1 **better** than 45r1 statistically **significant with 95% confidence**

46r1 better than 45r1 statistically **significant with 68% confidence**

not really any difference between 45r1 and 46r1

46r1 worse than 45r1 statistically **significant with 68% confidence**

46r1 **worse** than 45r1 statistically **significant with 95% confidence**

46r1 **worse** than 45r1 statistically **significant with 99.7% confidence**