

Electronic supplement to Kern, B. and Jöckel, P.: “The Modular Earth Submodel System (MESSy, 2.50_extended) as diagnostic interface of the ICOSahedral Non-hydrostatic (ICON) modelling framework”, Geosci. Model Dev. (2016).

Table S1: Model system runtime for the different testcases.

nodes	cores	runtime (s)			
		ICON only	MESSy interface	MESSy + GRAGG	MESSy + VISOP
no output					
64	1536	345.67	344.4	1218.66	397.22
128	3072	181.79	181.95	1013.27	207.76
256	6144	103.9	103.26	1016.06	116.57
512	12288	64.74	64.76	1045.58	71.6
ICON and submodel output					
64	1536	347.8	346.67	1364.41	403.94
128	3072	188.91	186.25	1218.12	216.05
256	6144	117.03	116.93	1164.59	131.08
512	12288	96.41	95.84	1175.66	105.21

Table S2: Model system runtime for the different optimised testcases.

nodes	cores	runtime (s)					
		MESSy + GRAGG			MESSy + VISOP		
		OMP	reduced	red. + OMP	OMP	reduced	red. + OMP
no output							
64	1536	1245.21	354.66	353.25	358.74	346.04	345.11
128	3072	1115.34	189.68	190.11	189.39	182.52	182.02
256	6144	1111.65	114.64	115.8	107.36	103.73	104.11
512	12288	1112.69	77.28	77.08	66.24	68.95	65.27
ICON and submodel output							
64	1536	1418.53	420.95	420.36	364.34	350.92	350.04
128	3072	1309.98	269.21	260.22	196.57	190.5	188.88
256	6144	1237.61	186.79	181.93	122.34	119.8	119.15
512	12288	1261.62	157.71	155.02	100.38	99.72	99.08

Table S3: Calculated speedup for the different testcases.

nodes	cores	ICON only	MESSy interface	MESSy + GRAGG	MESSy + VISOP	optimal speedup
no output						
64	1536	1	1	1	1	1
128	3072	1.9	1.89	1.2	1.91	2
256	6144	3.33	3.34	1.2	3.41	4
512	12288	5.34	5.32	1.17	5.55	8
ICON and submodel output						
64	1536	1	1	1	1	1
128	3072	1.84	1.86	1.12	1.87	2
256	6144	2.97	2.96	1.17	3.08	4
512	12288	3.6	3.62	1.16	3.84	8

Table S4: Calculated speedup for the different optimised testcases.

nodes	cores	MESSy + GRAGG			MESSy + VISOP			optimal
		OMP	reduced	red. + OMP	OMP	reduced	red. + OMP	
no output								
64	1536	1	1	1	1	1	1	1
128	3072	1.12	1.87	1.86	1.89	1.9	1.9	2
256	6144	1.12	3.09	3.05	3.34	3.34	3.32	4
512	12288	1.12	4.59	4.58	5.42	5.02	5.29	8
ICON and submodel output								
64	1536	1	1	1	1	1	1	1
128	3072	1.08	1.56	1.62	1.85	1.84	1.85	2
256	6144	1.15	2.25	2.31	2.98	2.93	2.94	4
512	12288	1.12	2.67	2.71	3.63	3.52	3.53	8