

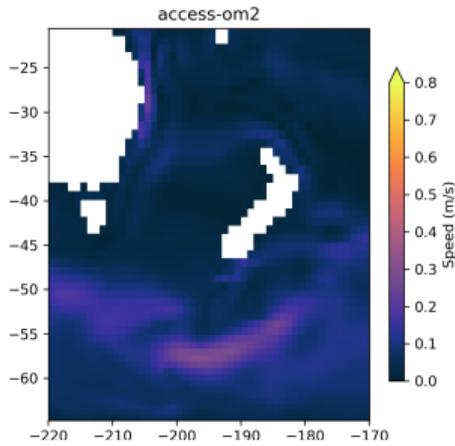
ACCESS-OM2: A Global Ocean-Sea Ice Model at Three Resolutions

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Consistent global configurations at three horizontal resolutions

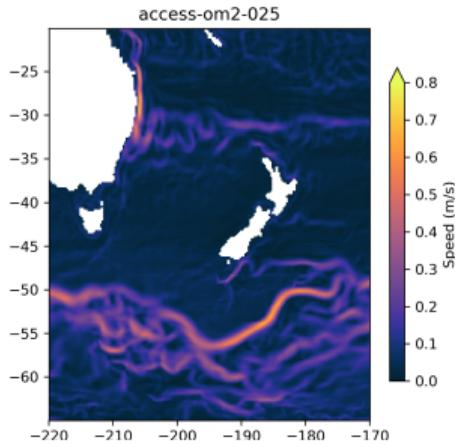
ACCESS-OM2

- ▶ 1° horizontal grid
 360×300 cells, 24–111 km
- ▶ $50 z^*$ levels
 $\Delta z = 2.3\text{--}220$ m
- ▶ fast and cheap
 $\sim 24\text{min/yr}$, 0.1 kCPU hr/yr
on 252 PEs, $dt=5400$ s
- ▶ many multi-century experiments
- ▶ not eddy-resolving



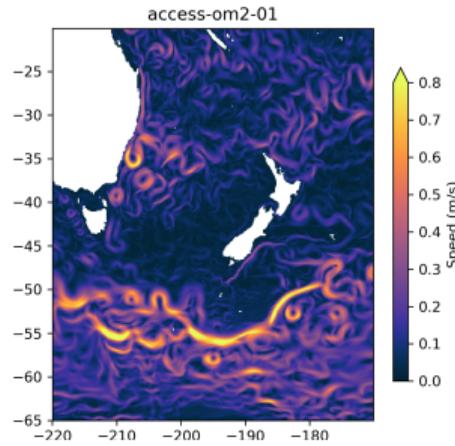
ACCESS-OM2-025

- ▶ 0.25° horizontal grid
 1440×1080 cells, 6.0–27.8 km
- ▶ $50 z^*$ levels
 $\Delta z = 2.3\text{--}220$ m
- ▶ fairly fast, less cheap
 105 min/yr , 4.5 kCPU hr/yr
on 1824 PEs, $dt=1800$ s
- ▶ several multi-century experiments
- ▶ eddy “permitting”

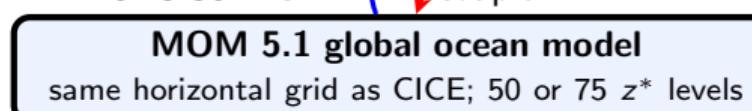
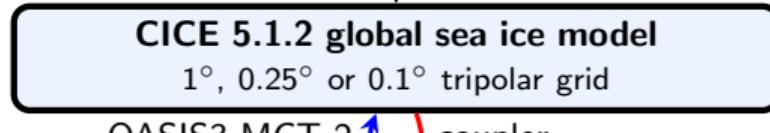
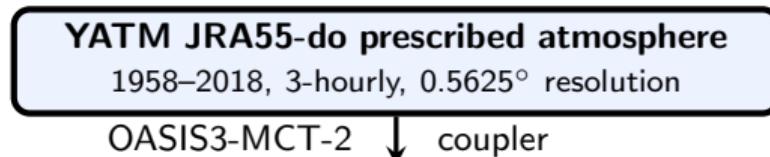


ACCESS-OM2-01

- ▶ 0.1° horizontal grid
 3600×2700 cells, 2.2–11.1 km
- ▶ $75 z^*$ levels
 $\Delta z = 1.1\text{--}198$ m
- ▶ slow, expensive
 9 hr/yr , 55–65 kCPU hr/yr
on 5096 PEs, $dt=600$ s
- ▶ several multi-decade experiments
- ▶ eddy-rich



ACCESS-OM2 coupled model components and performance



CPUs

1

24 at 1°

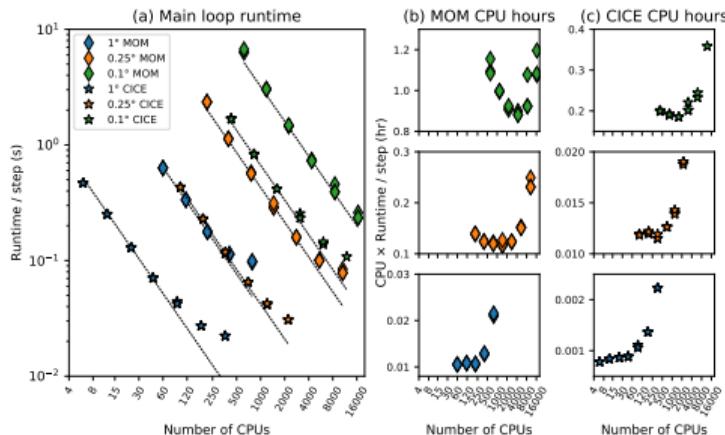
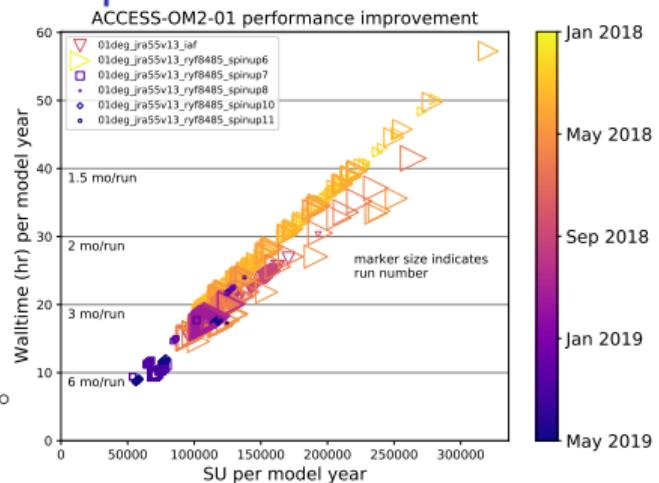
361 at 0.25°

722 at 0.1°

216 at 1°

1455 at 0.25°

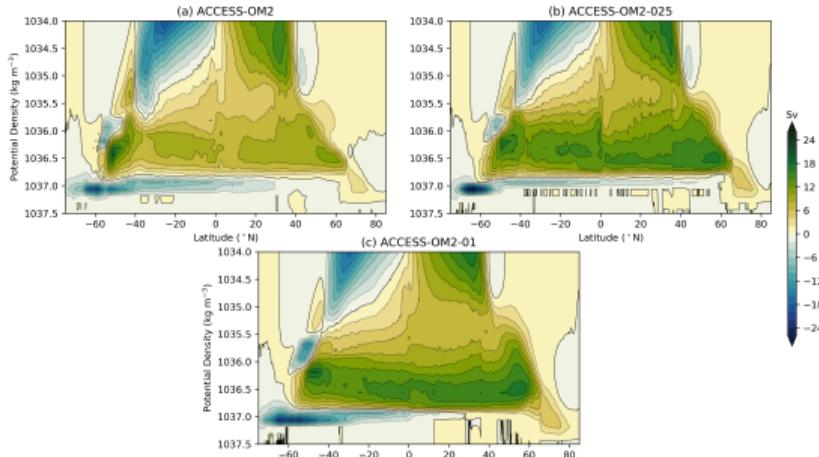
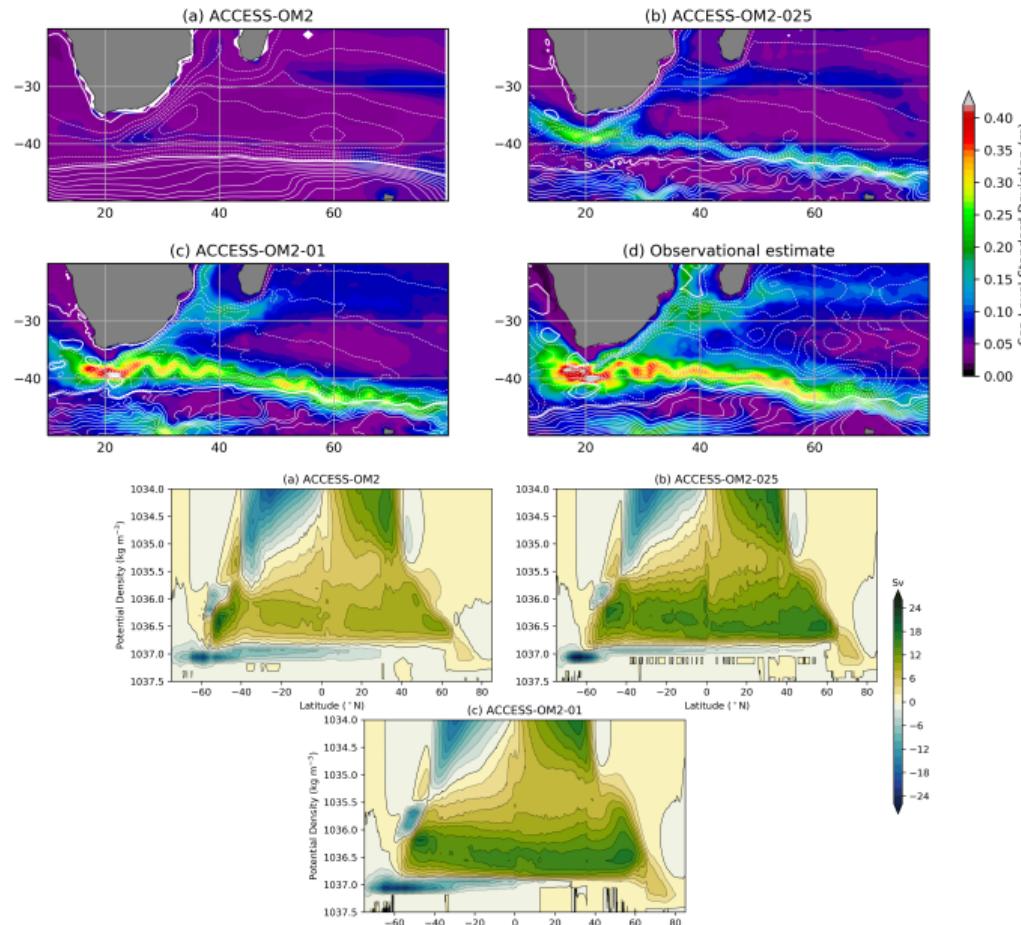
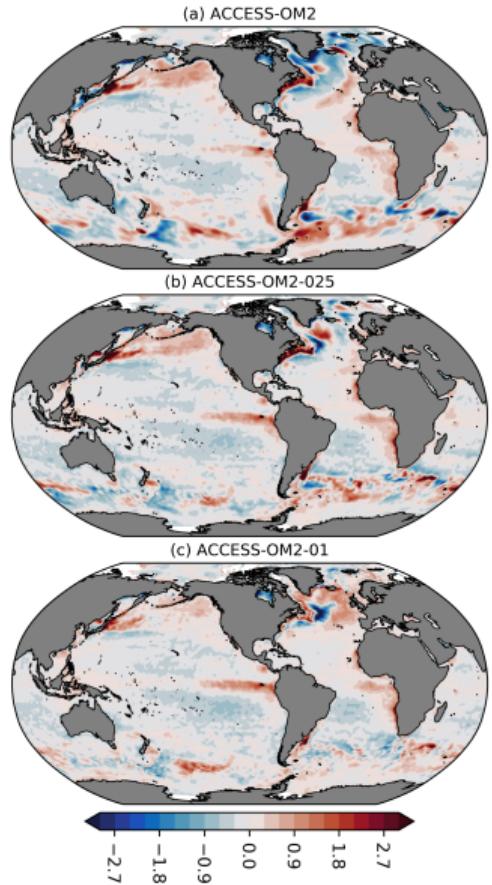
4358 at 0.1°



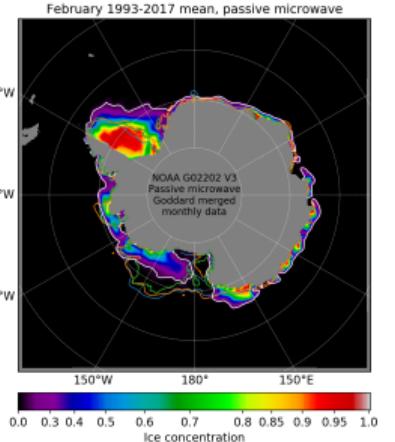
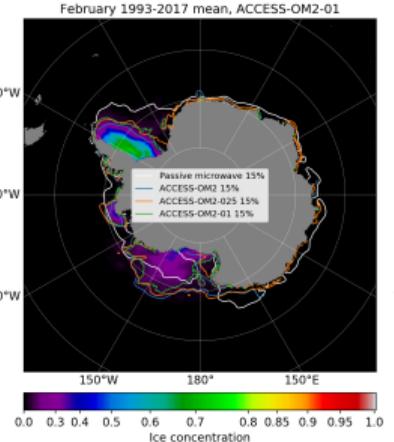
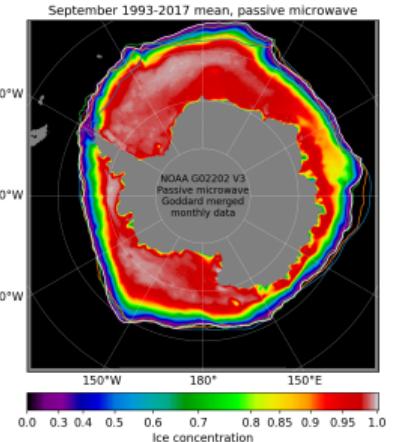
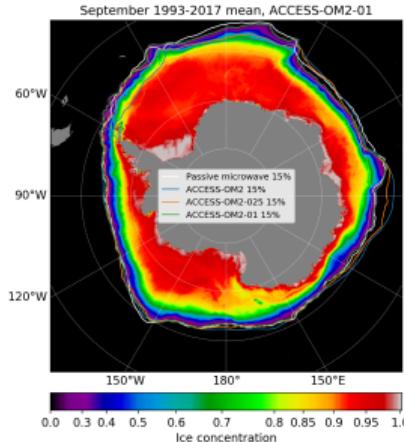
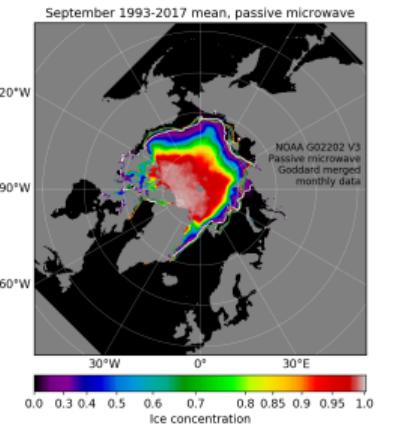
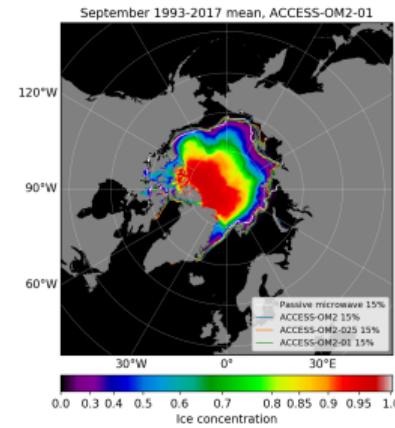
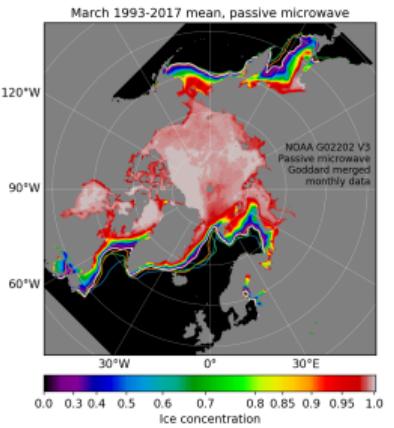
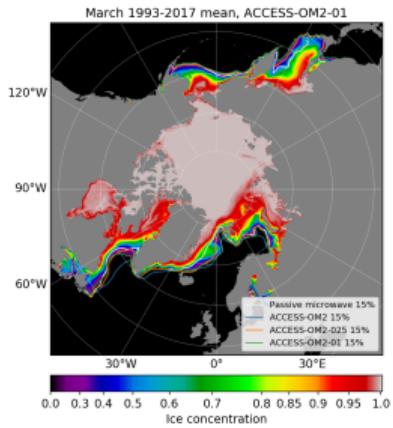
Major development effort greatly improved model performance and stability, particularly at 0.1° :

- ▶ MOM scales linearly up to 16,000 CPUs.
- ▶ CICE scales linearly up to 2000 CPUs.
- ▶ Now able to complete 6 model months within 5 hr job limit.

SST bias, Agulhas variability and overturning vs. resolution



Ice concentration vs. passive microwave estimates (1993–2017 monthly means)



The COSIMA community

cosima.org.au

github.com/COSIMA



- ▶ 2016 workshop: 20 talks, 38 participants
- ▶ 2017 workshop: 26 talks, 34 participants
- ▶ 2018 workshop: 30 talks, 49 participants (pictured)
- ▶ 30 authors on ACCESS-OM2 model description paper
- ▶ 60 users of ACCESS-OM2 models and data
- ▶ ARC Linkage: ANU, UNSW, UTas, AAD, BoM, CSIRO
- ▶ Model code, configurations & outputs all freely available

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