Sampling the MOM history and its offspring

Code and offspring	Equations	Basic algorithms	Key applications
Bryan-Cox-Semtner (1960s-1983) → Cox Code (1984-1989): English OCCAM and Hadley Centre models	Boussinesq primitive equations; B-grid; rigid lid; spherical grid	second order energetic numerics; horizontal/ vertical eddy mixing; isoycnal diffusion; convective adjustment	idealized sectors (coarse and eddying); equatorial dynamics; idealized global climate
MOM1 (1990-1994): LANL-POP and European ORCA	Same	Pacanowski-Philander mixing; Mellor-Yamada mixing; penetrative solar radiation	tropical ocean prediction; realistic global climate
MOM2 (1995-1998): Kiel FLAME model of Atlantic; Bremerhaven Arctic regional model	implicit and explicit free surface; partial bottom topography	neutral diffusion; GM stirring; suite of tracer advection, including FCT and Quicker	Entering regime where spurious mixing starting to be reduced, in favour of physical closures.
MOM3 (1999-2003): Japanese Earth Simulator global ocean OFES	robust explicit free surface for climate modeling; open boundaries for regional modeling	closures for neutral physics diffusivities; Smagorinsky horizontal viscosity; KPP; more tracer advection	coastal applications; global eddying simulations for decades to centuries
MOM4 (2004-now): Australian coastal and global models	general orthogonal grids; general vertical levels; non-Bouss; staggered time steps for tracer conservation	overflow schemes; variations on neutral physics; GOTM turbulence closures; tidal mixing; more tracer advection	All of above, with more extensive and realistic applications, from coasts to globe