Development of techniques

All calculations have prescribed vertical and horizontal variation of heating

Black (blue) indicates an available (still-to-be-developed) methodology. Red indicates partial success.

Mathematics		Physics			
boundary conditions	Solution of vertical structure equation	steady heating	unsteady heating	rotation	two-layers
Lid	Modal expansion **analytical k inversion**	A1	A2	A3	A4
	Modal expansion **numerical k inversion**	B1	B2	B3	B4
No lid	Fourier transform **analytical inversion**	C1	C2	C3	C4
	Fourier transform **numerical inversion**	D1	D2	D3	D4

Comments

Relatively easy to modify modal expansion codes to different vertical and horizontal heating profiles

Mapping of Research Questions to Available Resource

What question can we address with which of the available codes / analyses tabulated above

Atmosphere Structure	Single Layer, bounded				Single Layer, unbounded			
Coriollis	Non-rotating		Rotating		Non-rotating		Rotating	
Question \ Heating	Steady	Transient	Steady	Transient	Steady	Transient	Steady	Transient
what wave modes are induced / propagate	A1	A2	B3		C1		C3	
what is the qualitative effect of the rigid lid boundary conditions	A1 / D1		B3 / D3					
what trends are observed as lid raised	A1	A2	B3					
what is the sensitivity on heating functional forms with (a) profile definition (b) profile scales	A1		B3		D1		D3	
variable buoyancy frequency (presence of multiple layers)								
storm propagation	A1	A2	B3		D1		D3	