The following is a suggestion on how we could proceed on Friday morning:

Task 1: Add any (general) missing phenomena or conceptual criteria to the below

Task 2: Prioritise them

Task 3: Assign GENERAL responses to the columns - answers can be as per the column title, or "both"

PLESAE NOTE THAT THIS IS NOT MEANT TO BE A DEFINITIVE QUANTIFICATION - JUST A CONCEPTUAL INDICATION… A BEST GUESS AT WHAT MIGHT WORK.

	Note: focused on processes in atmosphere below ~100 km altitude	* Note: Anything in this column includes "Basic DA"; repetition of temperature specifies greater resolution requirements.				
		Ideal dataset to measure	Spatial or temporal priority?	Spatial or temporal frequency constraints	Column vs Profile Priority	Comments
X	Basic DA (pre-req for others)	Temperature required, column opacity desired	Spatial - Medium; Temporal - Medium	Spatial: all parts of globe; Temporal: sub-daily coverage		Column opacities needed to drive model; not necessarily to assimilate.
X	Zonal mean circulation (hadley & polar vortex)	Temperature - required; Wind - desired	Spatial - Medium; Temporal - Low	Spatial - Full Latitudinal Coverage Required		
X	Seasonal dust cycle (i.e. duration >30° Ls)	Column Opacity - required; Opacity profile - desired	Spatial - Medium; Temporal - Low	Spatial - Global Coverage	Column- High, Profile - High	
X	Traveling Waves	Temperature - required; surface pressure, wind desired	Spatial - High; Temporal - High	Spatial - Full Longitudinal Coverage; Temporal: Sub-daily		Spatial coverage can be quantitatively defined, since we study zonal waves 1-4. Boundary layer Temperature important.
X	Regional and Global Dust Storms.	Dust Aerosol Required; Temperature, Imagery Desired	Spatial - High; Temporal - High	Spatial - Global Coverage; Temporal: sub-daily desired	Column - High, Profile - High	Imagery for validation rather than assimilation (near term). If interest is for monitoring specific pre-defined region, aerocentric satellite may be helpful. Higher resolution temperature desired.
X	Tides	Temperature - required; Surface pressure desired	Spatial - Medium; Temporal - High	Temporal: many local times required		High vertical resolution and coverage needed.
X	Water cycle	Water Ice and Water Vapor Required	Spatial - Medium; Temporal - Medium	Spatial: Vertical profiles desired	Column - Medium, Profile - High	Temperature definitely needed for RH calculations. Assuming dust available for CCN; dust can help 2nd order.
X	Active species - O3	Ozone (via UV) required; water vapor and ice desired	Spatial - High; Temporal - Medium	Spatial: higher resolution in polar regions than equatorial	Column - Medium, Profile - High	Fundamental timescale of ~3 hours for relaxation to model. Water desired for heterogeneous chemistry needs.

X	**Passive species**	Species (via IR) required	Spatial - High; Temporal - Medium		Column - Medium, Profile - High
X	**Surface interactions (e.g. dust lifting, water exchange, CO2 deposition)**	Surface meteorology	Spatial - Point; Temporal - High		Some aspects can be studied locally, with preferences for certain locations. Network desired. Other aspects via global remote sensing.
X	**Gravity Waves**	Temperature required, wind desired.	Spatial - High; Temporal - High	Focused spatial and temporal coverage	Horizontal and vertical resolution may need to be extremely high.
X	**CO2 Cycle**	CO2 cloud required. Surface ice mass desired.	Spatial - Medium; Temporal - Medium.	Focus on polar regions.	Column - Medium, Profile - High Clouds may need both higher spatial and temporal resolution; surface ice can be low resolution.