

## A list of variables proposed as the new SIOS core data (SCD)

Outcomes from the SCD mapping and two SCD workshops.

### Atmosphere

New suggestion	Definition	GCMD Keywords	Comments
Total electron content (TEC)	pertain to ionized atmosphere	ATMOSPHERIC ELECTRICITY/TOTAL ELECTRON CONTENT	
ABL turbulence	ABL turbulence is a wide term. I suggest to split ABL turbulence in some basic surface layer parameters :  Sensible heat flux, friction velocity and roughness length		
Albedo	in GCOS is attributed to land/biosphere	EARTH SCIENCE/ATMOSPHERE/ATMOSPHERIC RADIATION/ALBEDO	
UV radiation	broadband or integrated by spectrum		
Aerosol precursors	Atmospheric concentration of gas phase species acting as precursors of secondary aerosol including DMS, SO <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub> , MSA (in the gaseous phase), NH <sub>3</sub> , iodine compounds, etc.		
Refractory BC	The carbon mass derived from laser induced incandescence (LII) (mass per unit of volume).		
SCD 1.16. TROPOSPHERIC OZONE			Add stratospheric ozone and total column ozone
SCD 1.19. AEROSOL PARTICLE PROPERTIES	Particle number size distribution -mobility diameter		Divide SCD 1.19 into 7 different variables
	Particle number size distribution – optical and aerodynamic diameter		
	Particle number concentration		

	Number concentration of cloud condensation nuclei		
	Nanoparticle number concentration		
	Nanoparticle number size distribution		
	Particle mass concentration PM10 and/or PM2.5		

## Cryosphere

New suggestion	Definition	GCMD Keywords	Comments
Basal ice	Amount of ice between the ground surface and the snowpack	EARTH SCIENCE/LAND SURFACE/GEOMORPHIC LANDFORMS/PROCESSES/GLACIAL PROCESSES/FREEZE/THAW/BASAL ICE FREEZING	
Firn	Water table depth from the snow surface, density and temperature	EARTH SCIENCE/TERRESTRIAL HYDROSPHERE/GLACIERS/ICE SHEETS/FIRN  EARTH SCIENCE/CRYOSPHERE/GLACIERS /ICE SHEETS/FIRN	
Ground subsidence	Downward movement of the ground causing a lowering of the ground surface resulting from the melting of ground ice in excess of pore fillings		
Front fluctuations of tidewater glaciers		EARTH SCIENCE/CRYOSPHERE/GLACIERS /ICE SHEETS/GLACIERS/GLACIER TERMINUS  EARTH SCIENCE/TERRESTRIAL HYDROSPHERE/GLACIERS/ICE SHEETS/GLACIERS/GLACIER TERMINUS	

## Terrestrial

New suggestion	Definition	GCMD Keywords	Comments
Soil temperature		EARTH SCIENCE/LAND SURFACE/SOILS/SOIL TEMPERATURE	Proposed by UNIS

Water conductivity		TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>WATER CHARACTERISTICS>CONDUCTIVITY	Proposed by NVE
Runoff		TERRESTRIAL HYDROSPHERE>SURFACE WATER>SURFACE WATER PROCESSES/MEASUREMENTS>RU NOFF	Proposed by NVE
Suspended solids		TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>SOLIDS>SUSPENDED SOLIDS	Proposed by NVE
Organic matter		TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>WATER CHARACTERISTICS>ORGANIC MATTER	Proposed by NVE
biological data on migratory birds, the food web and fresh water systems			Proposed by RUG. Need to wait for the COAT data repository

## Oceans

New suggestion	Definition	GCMD Keywords	Comments
Nitrate	After discussion with Biologists at UNIS, either the GCOS or GCMD definitions encompass what we are measuring.	EARTH SCIENCE/OCEANS/OCEAN CHEMISTRY/NITRATE	Proposed by UNIS
Nitrite	Probably something like [ $\mu\text{mol L}^{-1}$ ]	EARTH SCIENCE/OCEANS/OCEAN CHEMISTRY/NITRITE	Proposed by UNIS
Phosphate		EARTH SCIENCE/OCEANS/OCEAN CHEMISTRY/PHOSPHATE	Proposed by UNIS
Silicate		EARTH SCIENCE/OCEANS/OCEAN CHEMISTRY/SILICATE	Proposed by UNIS
CHLOROPHYLL- FLUORESCENCE	Fluorescence-derived concentration of chlorophyll-a pigment at a specific water depth [ $\mu\text{g L}^{-1}$ ] (sensor)	OCEAN CHEMISTRY / CHLOROPHYLL / CHLOROPHYLL CONCENTRATIONS	Proposed by UNIS
Tides	Tides amplitude - daily water level changes	EARTH SCIENCE / OCEANS /TIDES	Proposed by IGF

		EARTH SCIENCE / OCEANS / COASTAL PROCESSES / TIDAL HEIGHT	
Oxygen concentration	<p>Dissolved oxygen concentration measured with depth (ml/l)</p> <p><a href="https://gcos.wmo.int/en/essential-climate-variables/oxygen">https://gcos.wmo.int/en/essential-climate-variables/oxygen</a></p> <p>May be measured in many units: concentration or % - all valid</p>	EARTH SCIENCE / OCEANS / OCEAN CHEMISTRY / OXYGEN	Proposed by IGF
Suspended Particulate Matter (SPM) with Particulate Organic Matter (POM) and Inorganic Matter (PIM)	SPM concentration at specific water depths (mg/l) filtered from water samples. POM and PIM calculated from loss on ignition (LOI) in 550 C	EARTH SCIENCE / OCEANS / MARINE SEDIMENTS / SUSPENDED SOLIDS	Proposed by IGF
Water Turbidity	SPM concentration measured with Turbidity Sensor (FTU)	EARTH SCIENCE / OCEANS / MARINE SEDIMENTS / TURBIDITY	Proposed by IGF
Photosynthetically active radiation	<p>Measured with HOBO PAR sensor</p> <p>(for SIOS any PAR sensor data would be acceptable?).. In water at depth??</p> <p>(Unit=<math>\mu\text{mol photons m}^{-2} \text{ s}^{-1}</math>)</p> <p>?</p> <p>I will need to find more about this as I am not involved in this myself (LM - UNIS)</p> <p>Unit:</p> <p>Downwelling irradiance for frequencies relevant to photosynthesis (from 400 to 700 nm). Measured in energy (<math>\text{Wm}^{-2}</math>) or in quanta <math>\mu\text{mol}</math> of photons <math>\text{m}^{-2} \text{ s}^{-1}</math>.</p>	EARTH SCIENCE / OCEANS / OCEAN OPTICS / PHOTOSYNTHETICALLY ACTIVE RADIATION	Proposed by UNIS
Sediment Flux with POM and PIM	The sediment flux ( $\text{kg/m}^2$ per day) from sediment traps exposed for at least 12/24 hours (one tide cycle) at various depths and above the bottom with POM and PIM part calculated from LOI	EARTH SCIENCE / OCEANS / MARINE SEDIMENTS / PARTICLE FLUX	Proposed by IGF