**System of systems approach to measurements: Formalising the reference-baseline-comprehensive networks concept: what, why, how?**

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There are many documents and networks that make reference to a “system of systems” observing architecture, but there is no common concept, let alone adoption, to date. Different networks in different domain areas follow distinct practices, leading to a mosaic of conventions that serve to obfuscate and confuse more than illuminate or help. Following the discussions at the network meeting that preceded the GCOS Atmospheric Observing Panel for Climate (AOPC) meeting in 2014 (reported in GCOS-182), under the auspices of GAIA-CLIM, an effort has been made to articulate a possible pathway forwards that consists of: reference, baseline and comprehensive observing networks. Several assessment strands relating to aspects such as metadata, measurement continuity, uncertainty quantification and accessibility have been proposed. These are similar to, but distinct from, the dataset maturity matrix approach developed under the CORE-CLIMAX project, because the maturity matrix is reflecting the distinction between basic measurements and derived products. The approach proposed by GAIA-CLIM builds upon the outcomes agreed in GCOS-182 and has been developed with input from the GCOS Implementation Manager. Possible next steps towards broader community adoption shall be covered.