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GCOS Reference Upper Air Network: GATNDOR - GRUAN Analysis Team for Network Design and Operations Research

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The GCOS Reference Upper Air Network (GRUAN) is an international reference observing network, designed to meet climate requirements and to fill a major void in the current global observing system. The GRUAN Analysis Team for Network Design and Operations Research (GATNDOR) is a research team, established in 2009, supporting the development and implementation of GRUAN on scientifically sound foundations. The team performs short-term focused research to address specific topics identified by the GRUAN science and management community. The research team identifies and carries out a series of well-defined, limited-scope retrospective analyses of existing observations from established stations that are potential GRUAN sites, other complementary observations, metadata, and model simulations. The unifying purpose of this series of studies will be to obtain insight from existing information for optimizing the design and implementation of the GRUAN observational program to meet its scientific goals. Results from the performed analysis are made available to the GRUAN community through peer-reviewed papers reporting the outcome of the proposed research topic. Therefore, GATNDOR main objective is to make available to the GRUAN stations tools, recommendations and observation strategies for the optimization of network operations. GATNDOR team is currently investigating three topics. The topics are: - Atmospheric Variability and co-location; - Management of Change; - Quantifying the Value of Complementary Observations The first topic aims at comparing atmospheric observations measured with different techniques at the same site but not taken at exactly the same time and the exactly same spot (quasi-redundant). The objective is to provide a definition and a tool for evaluating to what extent quasi-redundant measurements can be considered co-located on the basis of the observation variability and the instrumental uncertainties. The second topic intends to provide scientific basis to develop operational practices in better managing changes at GRUAN sites from one instrument type to another and to accurately merge the two data segments to create a homogeneous time series. The objective is to provide a quantitative assessment and provision of a sampling strategy as well as an optimal strategy for managing the change at the GRUAN sites. Finally, the third topic aims at quantifying the value of observation redundancy in reducing measurement uncertainty of a given thermodynamic variable. The objective is to provide recommendations for an optimal observation strategy related to GRUAN phase 1 and 2 as well as for the ground-based remote sensing equipment to operate/acquire at the GRUAN sites. The description of GATNDOR mission and a few highlights from the past and current research performed by GATNDOR will be presented and discussed along with perspectives for both the current investigated topics and new potential research question identified as priorities for GRUAN.