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## Traceability of ground based air temperature measurements: a case study on the Meteorological Observatory of Moncalieri (Italy) G. Lopardo<sup>1</sup>, F. Bertiglia<sup>1</sup>, A. Gilabert<sup>2</sup>, G. Roggero<sup>1</sup>, L. Mercalli<sup>3</sup>, A. Merlone<sup>1</sup> <sup>1</sup>INRiM-Istituto Nazionale di Ricerca Metrologica, Torino, Italy g.lopardo@inrim.it Centre for Climate Change <sup>2</sup>Centre for Climate Change , Department of Geography, University Rovira i Virgili, Tarragona , Spain CI. Universitat Rovira i Virgili <sup>3</sup>Società Meteorologica Italiana, Bussoleno – Torino, Italy **Metrological Traceability** Aim Ensuring a defined traceability to "Property of a measurement to be related to a the national standards for air standard of the International System of Units through *temperature* recorded by automatic an unbroken chain of calibrations each contributing to weather stations the measurement **uncertainty**" Confidence in the result ITS-90 fixed point Quality of measurement Equivalence to other similar measurements Platinum Resistance Thermometer (PT25) calibrated *ITS-90* at fixed point of: Triple point H<sub>2</sub>O - freezing point In • The International Temperature Scale of 1990 is Triple point Hg - Triple point H<sub>2</sub>O- Melting point Ga the reference for temperature measurements. The physical principle is phase transition of pure materials temperature sensor Primary reference standards for realizing the response plus datalogger was scale are fixed points cells (discrete scale) with primary compared a • For a continuous reference a transfer temperature standard in the instrument is adopted: Standard Platinum range of atmospheric variability Resistance Thermometer (SPRT) [-20 °C ÷ 40 °C] Interpolation functions for this thermometer are part of ITS-90 23 June 2012 to 12 March 2013 Black lines: Tn calibrated, Dashed red line: Tn uncal. %|0.21|=23.574







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A measurement has metrological traceability if:

• An unbroken and documented chain of calibrations links the instrument to an internationally agreed reference;

• Each chain link has documented uncertainty estimations;

 The final user has procedures to ensure that the instrument maintains calibration and uncertainties over time;

 The influence factors affecting the measurement are quantified and a total uncertainty is reported



Establishing traceability of measurement for science, industry and trade is the aim of **Metrology** 

