

Annex

The used terminology in the current key attributes list (https://glossary.ametsoc.org/) and more detailed explanation why they should be replaced:

Reflectivity – The basic radar variable is actually called **radar reflectivity factor**, which is stated in units of mm⁶ m⁻³ or provided also as dBZ. The radar reflectivity factor is proportional to the reflectivity which again has dimensions of area per unit volume (e.g., cm²m⁻³, or, more commonly, cm⁻¹ or m⁻¹), however reflectivity is not given as observable of the weather radar.

Backscatter – By definition is the scattering of radiant energy into the hemisphere of space bounded by a plane normal to the direction of the incident radiation and lying on the same side as the incident ray. Presumably here it is meant to describe the backscatter coefficient, i.e., the physical quantity used to describe the backscattering process, are m⁻¹ sr⁻¹ (per meter and steradian). This is a measure of the reflective strength of a radar target, however also here, backscatter coefficient is not given directly as a radar observable, but **radar reflectivity factor** is the used quantity. Therefore, it is assumed that the two first terms of the key attributes list are describing the same radar observable.

Polarization – is general term describing the correlation between two orthogonal components of its electric (or, equivalently, magnetic) field for a transverse electromagnetic wave. With respect to weather radar, here it is probably meant, the radar variables that can be measured with dual-polarization radars. Dual-polarization weather radars measure typically with two linear polarizations, orthogonally horizontal and vertical directions. The basic and operationally measured dual-pol radar variables are differential reflectivity Z_{dr} , propagation differential phase shift (ϕ_{dp}) , and co-polar correlation coefficient (ρ_{hv}) , but there are also other dual-pol variables. However, it is assumed here that in the list of key attributes should not go to this much of detail, but the term **the basic dual-polarization variables** could be used to describe these observables.

Precipitation – Weather radar doesn't measure precipitation directly, however the instantaneous precipitation rate (mm/h) or rain rate (mm/h) can be derived using retrieval algorithm from the measured radar reflectivity factor. Therefore, it is suggested to be described this quantity either as **the basic** radar product in general terms or as **instantaneous precipitation rate (mm/h) or rain rate (mm/h)**.

Wind – Weather radar doesn't measure wind directly, however Doppler radars can observe radial velocity component from the hydrometeors or other scatterers in the atmosphere, also known as Doppler velocity. Interpretation of the Doppler velocity depends on the viewing geometry and the kind of target. Clear-air echoes are assumed to move with the wind, so that the Doppler velocity measured at a given location in the atmosphere is equal to the radial component of the wind at that location. Precipitation falls relative to the air, so that the Doppler velocity of a precipitation target is assumed to be the sum of the radial velocity component of the precipitation terminal fall velocity and the radial component of the air motion. To simplify the interpretation, in the list of key attributes the term **radial velocity** should be used instead of wind. There is also a radar product called wind profile, but this is not necessarily computed in all Meteorological Services in Europe and computational algorithms differ nationally.

Echo tops – is a product based on radar observations and used often in detection of convective storms. Basically, an echo top is a top of an area of precipitation indicated by the radar. This product is created either from a single or multiple radar volume observations. The definition is depended on



the used thresholds to define the cloud top as well as from the wavelength and sensitivity of the radar system. There exist several algorithms how this product can be computed. This is not a direct radar observable, nor it is created in all Meteorological Services in Europe and due to the before-mentioned reasons, this quantity is not comparable between the different member states. Hence, it is suggested to remove this from the list of key attributes.

If any questions or request for clarification, please contact:

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