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## The Virtual Alpine Observatory (VAO) acting to better observe, understand, forecast and react to climate change in a combined Network of European High-Altitude Research Stations

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The Alpine region undergoes a faster and more pronounced climate change than surrounding lowlands and, therefore, is a time machine showing the things to come in a changing climate and environment. Under the influence of a robust warming trend, witnessing an ascent of >1°C since the 1980s significant effects are visible and measurable in atmosphere, biosphere, hydrosphere, and most apparently the cryosphere.

The Virtual Alpine Observatory is an assemblage comprising European Alpine Observatories, high alpine research facilities, data archives, and supercomputing centers, seamlessly interwoven through shared infrastructure and collaborative research pursuits. It is the answer to how the complex Alpine environmental system can be addressed by an interdisciplinary, cross-border collaborating research paradigm. At its core, the primary objective is to orchestrate collective endeavors aimed at observing, comprehending, and prognosticating the ramifications of climate change on the Alpine expanse. This extends to the multifaceted facets of the environment in multiple aspects.

This alliance of researchers and data-gathering institutions spanning the Alpine landscape and analogous mountainous terrains in Europe propels the exploration of data patterns transcending national boundaries. In doing so, it creates a reservoir of data, knowledge and scientific approaches that surpasses the cumulative understanding derived from its individual constituents.

In the upcoming discourse, we illuminate the network's future goals, composition, unveil forthcoming research initiatives, expound upon data availabilities, and deliberate on the

trajectories that lie ahead for collaborative efforts.

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