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Teleconnection patterns associated to temperature variability inside Scarisoara Ice Cave

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The relationship between temperature variability inside Scarisoara Ice Cave (NW Romania) and large-scale atmospheric circulation and sea surface temperature anomalies is investigated. A composite analysis reveals that high (low) temperatures inside the cave are associated with high (low) air temperature over a large area that covers central and Eastern Europe. Coherent large-scale patterns are identified in the field of sea surface temperature anomalies. The corresponding atmospheric circulation patterns favor relatively warm (cold) air advection toward the cave region during high (low) temperatures inside the cave. A correlation analysis reveals that the atmospheric circulation patterns associated with cave temperature variability is mainly the result of East Atlantic-Western Russia (EA-WR) teleconnection pattern. Based on historical high-resolution climate data sets we show that a large part of the interannual and decadal variations of temperature in the cave region is related to the EA-WR pattern and the North Atlantic Oscillation. Our results have strong implications for the interpretation of climate variability in the region as recorded by the ice block within the Scarisoara Ice Cave, which is more than three thousand years old. In particular, they open the possibility of the reconstruction of the EA-WR index over the last three thousand years.