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Network properties of meteorological stations connected by rank of phase synchronization or cross-correlation

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We study the phase synchronization and cross-correlation of meteorological records and determine for each pair of records the values for best phase synchronization and cross-correlation by varying the time lag s. We consider the stations as nodes, which we connect one by one according to their rank ordered values of maximum phase synchronization or cross-correlation, after subtraction the trivial influence of distance. We analyze the statistical properties of the emerging networks and find for both, phase synchronization and cross-correlation networks, remarkable differences with the random networks, in particular when cluster sizes and degree distributions are considered.