



## **Separation of the natural and anthropogenic components in the surface temperature records.**

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Current climate is shaped by its natural variability and response to the anthropogenic activity. To predict the state of the climate for the next decades, it is essential to assess the impact of both components. However the anthropogenic signal within relatively short and noisy observational data sets may correlate or may be masked by natural climate oscillations. Therefore it is important to separate an effect of natural and anthropogenic components.

In this study both the dynamical and statistical approaches are combined to decompose surface temperature records. Capability of statistical methods to separate between linear trends and long-term variability is limited. Therefore the anthropogenic response is estimated using climate models and subtracted from observational data sets. Further decomposition of the observational residuals is performed by using Multi-channel Singular-Spectrum analysis (M-SSA).

Analysed model simulations come from phase 5 of the Coupled Model Intercomparison Project, while observational data sets are: Met Office HadCRUT4, HadISST and Reynolds OI.

Derived results indicate that not only the anthropogenic signal, but also long-term natural variability components will have a significant impact on the temperature records for the next decades.