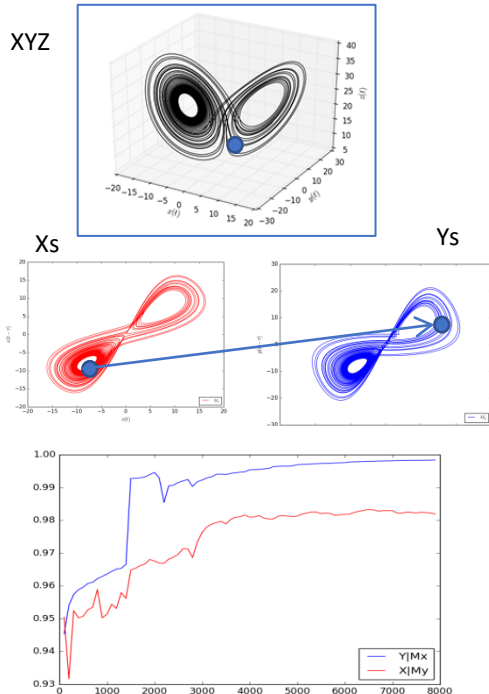# Snow-albedo feedback as a plausible mechanism of Wolastoq spring flooding

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Wolastoq's (St. John River) spring flood entails non-linear hydro-meteorological processes. The Regional Climate Model (RegCM) is used to simulate such anomalous phenomena with an aid from Cross Correlation Mapping (CCM) method**.**

XYZ

Xs

Ys

Lorenz attractor: x maps Y (red) and Y maps X (blue) correlations (Y axis). Correlation increases with increasing the length of the time series (X axis)

CCM justifies and discovers **cause-effect** relation between noise free observed variables of ecosystem or earth system and to discover, if there is a feedback interaction among these variables.
The key element of this method is that, if the correlation between the constructed/estimated variable and the observed value increases with increasing the time period, then there is a **cause-effect** relation between X and Y or, it may be a **feedback/bi-directional** causation.

Upper Basin Surface Runoff

A

Upper Basin Snow melt

B

C
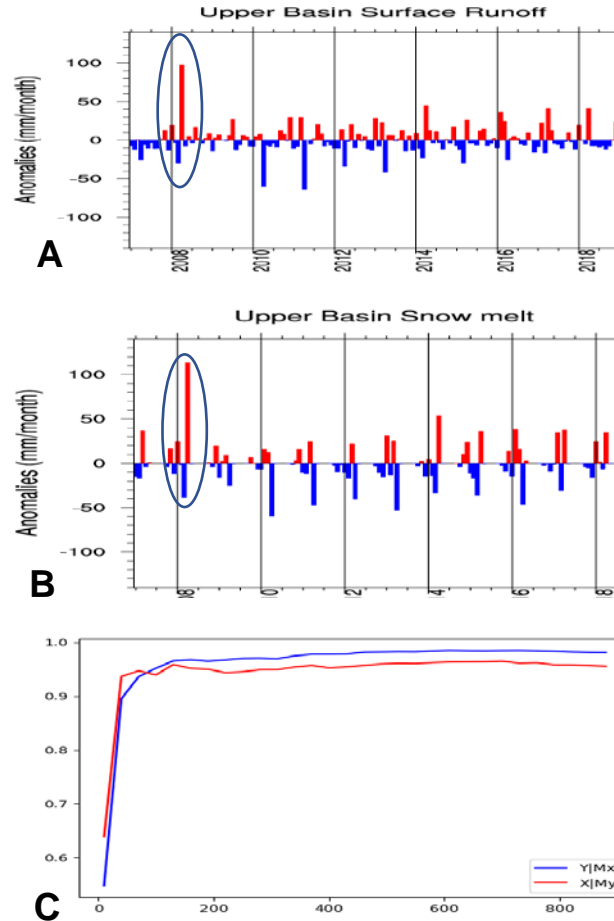
RegCM simulation reveal that Spring 2008 witnessed very large anomalies in surface runoff, which is a proxy to flood **(A)** and is in synchrony with a positive snow-metl anomaly **(B).** CCM is used to justify the main hypothesis of this study that the snow-albedo feedback mechanism accelerates the snow-melt process which, in turn, enhances the flood intensity **(C)**. The main conclusion is that snow-albedo feedback is working on regional scale or land-scape scale and is a plausible mechanism of snow-melt hydro-meteorological process.