Insight into climate reconstruction from tree ring

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We consider the problem of climate reconstruction using tree rings. Such a reconstruction provides a tool to validate modern models of climate change. Some past and present methods are discussed while a Bayesian approach is suggested.

Over the last few years there has been a huge interest in paleoclimate reconstructions, due to their immense potential uses to understand climate variability. To date , paleoclimate reconstructions have been carried out using a range of statistical techniques including Principal Component Analysis (PCA) and Generalised Linear Models (GLM). While, these techniques have yield many important insights into the behaviour of the climate system however, there is inconsistency between these techniques. In addition, most of these techniques share some problems even in their limited application. The most common ones are a reliable and realistic modelling of the uncertainty with which climatic variables are reconstructed.

In the environmental sciences, a large knowledge base is typically available on an investigated system or at least on similar systems. This makes the application of Bayesian inference techniques in climatic reconstruction very promising. In spite of this however, it

seems that they have received relatively little attention when it comes to assessing their potential for uses in climate reconstruction.

Consequently, we suggest a Bayesian Hierarchical Model for climate reconstruction. Two main reasons underpinning this method are the possibility of quantifying uncertainty and that of exploiting the relationships between proxy and climate data.