



## **Simulation of the atmospheric tape recorder signal in HCN**

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Variations in the mixing ratio of long-lived trace gases entering the stratosphere in the tropics are carried upward with the rising air with the signal being observable throughout the tropical lower stratosphere. This phenomenon is referred to as “atmospheric tape recorder”. The tape recorder phenomenon has been observed for water vapour, for CO<sub>2</sub>, and for CO; for all three trace gases, the cycle repeats every year. Recently, based on Microwave Limb Sounder (MLS) and Atmospheric Chemistry Experiment (ACE) satellite measurements, a tape recorder signal has been reported for HCN but with an approximately two year period. Here we report results of a model simulation of the HCN tape recorder for the time period 2005–2008 using the Chemical Lagrangian Model of the Stratosphere (CLaMS). We find that the observed pattern of the HCN tape recorder signal can be reproduced by a model simulation using only emissions from Indonesian fires as boundary conditions at the ground. This finding supports the notion that inter-annual variations in biomass burning in Indonesia, which are strongly influenced by El Niño events, control the HCN tape recorder signal. This implies that the signal will have an irregular cycle rather than a two-year cycle.