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The Climate System at Maximum Entropy Production

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The possibility that the Earth's climate system is in a state of maximum entropy production has been discussed repeatedly over the past 30 years. Circumstantial evidence in support of the hypothesis has been put forward repeatedly, along with numerous applications in the context of simple models. Few of these applications have produced convincing evidence that the real climate system works in this way. The most promising approach to answering the question seems to have been that of Dewar who demonstrated the connection between maximum thermodynamic entropy production and Shannon's information entropy, although subsequent work by Grinstein & Linsker has shown that Dewar's results are not as general as previously thought. This presentation will discuss very recent results which connect Dewar's work to Boltzmann dynamics and the macroscopic or hydrodynamic limit. This approach demonstrates firstly that the climate system is indeed at a maximum of the entropy production but secondly that the scale on which this constraint applies is very small. There is a connection to closure of sub-grid scale models and the resolution at which these closures are rigorous.