Tropical rain, magnetism have same physics

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U.S. scientists say they have found magnetism and the onset of intense tropical rainfall share the same underlying physics.

Ole Peters and David Neelin of the Santa Fe (N.M.) Institute say they found a link between the physics of the two events, even though magnetism has a lot of exact theoretical machinery behind it and no one can predict tomorrow's weather.

They say their discovery is an example of universality -- a property that enables different physical systems with vastly different length-scales to behave in similar ways near a phase transition.

The researchers analyzed the vapor content of tropical precipitation and found it undergoes a smooth, continuous phase transition to a state of intense downpour as the amount of water vapor passes a critical value.

That observed long-range correlated behavior in atmospheric convection, of up to hundreds of miles, is similar to that of magnetic micrometer-scale crystals.

The scientists said the discovery that such simplicity lies behind a complex meteorological system was unexpected and may pave the way for future climate models.

The research is detailed in the June issue of the journal Nature Physics.