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Abrupt monsoon failure - mechanism for sustained 'dry-state' in comprehensive climate model

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Regular monsoon rainfall in India provides the basis of living for more than one billion people. Recently the possibility of abrupt monsoon failure was demonstrated in a conceptual framework. Here we identify an exceptionally weak monsoon in a realistic simulation of the past millennium in a state-of-the-art comprehensive climate model and provide mechanisms for monsoon failure and sustained development of a dry circulation system: Small perturbations in surface reflectivity in early spring suppress proper initiation of the moisture-advection feedback and thereby inhibit the development of regular monsoon precipitation. Instead a qualitatively different atmospheric circulation evolves with rainfall reduced by $\sim$70% compared to the long term mean. The event is abrupt in the sense that it is preceded and followed by years with average rainfall.