



Atmospheric polar amplification mechanisms of global warming

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It is widely believed that the surface albedo feedback is the most important mechanism responsible for the polar amplified shape of surface warming in response to doubling the CO₂ concentration. It has been shown that a pronounced polar amplified response can be obtained in an aquaplanet model with constant albedo of the surface. Polar amplification mechanism unrelated to surface albedo feedback are explained in a hierarchy of models from simple conceptual to idealized GCMs. Simple conceptual framework is proposed for explaining the seasonality of PA. Seasonality of polar amplification seasonality is studied in models with and without presence of continents. Significant polar amplification over continents in the winter can be explained even without any snow or ice albedo feedbacks. Importance of atmospheric heat transport by transient and stationary waves is analyzed.