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Minimalistic approach to planetary cloudiness

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Understanding planetary cloudiness is of major importance for Earth's energy balance and potential for warming, but so far we lack pathways to approach planetary cloudiness theoretically. On the one hand, it is difficult to connect the microphysics of cloud formation to planetary wide cloudiness. On the other hand, a representation of cloudiness in energy balance models simply does no exist yet. In this work we want to provide simple means to treat planetary cloudiness in an energy balance model. We utilize a top-down approach and directly decompose the energetic signature of planetary cloudiness into a simple model composed of simple components. Vertical wind speed and estimated inversion strength are enough to capture all major characteristics of cloudiness in both shortwave and longwave spectral signatures. Other variables provide only minor improvements to the fits, while surface horizontal wind speed seems to be important for capturing hemispheric asymmetries in cloudiness. We use our results to argue that cloudiness can be incorporated into conceptual models based on mean temperature and equator-to-pole temperature difference.