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Case study of a tropical-extratropical interaction and associated heat low development during the AMMA SOP 2006 pre-monsoon season

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Tropical Extra-tropical Interactions (TEIs) are often observed in association with an upper-level subtropical trough that penetrates into the tropics and, therefore, interacts with the tropical circulation. As a visible sign, a mid- to upper-level cloud band at the eastern flank of the trough and its related Subtropical Jet, named Tropical Plume (TP), is identifiable in infrared satellite imagery. McGuirk et al. (1987) gave a definition of Tropical Plumes and described the cloud bands as a northern hemisphere winter time phenomena. Previous studies identified TPs throughout the year with being rare in the June–mid- September period.

Results of convection dynamics influenced/caused by TEIs during a pre-monsoon season event between 19 and 30 May 2006 will be presented. This case is characterized by two different investigation regions affected by TEI: During the first half of the event high precipitation amounts south-east of the cloud band over Burkina Faso, Benin, Togo, and Ivory Coast are observed caused by thermal forcing and dynamical maintenance by trough related good upper-level outflow conditions due to ageostrophic acceleration towards the trough and low inertial stability, or even inertial instability.

This presentation is focused on the second half of this TEI event, which is characterized by the development of a pronounced heat low (HL) south-east of the upper-level trough over tropical West Africa, followed by convection south-east of the low pressure centre. A modified form of the pressure tendency equation (PTE) used by Knippertz and Fink (2008) is a diagnostic tool to investigate, which processes cause pressure drop near the Mali–Burkina Faso border by using both, the operational ECMWF Analysis and the AMMA EU re-analysis. The latter contains additionally the diabatic heating tendencies. Therefore, all terms of the PTE were calculated and will be discussed.