FORECASTING ACTIVITIES DURING THE SUMMER 2006 SOP OF AMMA PROPOSITION OF A SYNTHETIC ANALYSIS SPECIFIC TO THE WEST AFRICA

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Abstract: The AMMA (African Monsoon Multidisciplinary Analysis) is an international project to improve our understanding of the West African Monsoon (WAM) and its variability. A team of African Forecasters have been set up to operationally provide forecasts all during the AMMA 2006 campaign held in Western Africa this summer (1st June to end September 2006). We present here the original forecasting method that has been developed to fulfil the needs of the AMMA Operational Centre in Niamey (Niger).

Keywords – *THORPEX, WMO, African monsoon, Forecasting method*

1. INTRODUCTION

The task of a forecaster involves the analysis of numerous observations and NWP products (both analysis and forecasts) before deciding on the weather forecast for a given location and range. This is a very complex process involving both objective and subjective criteria and where the experience of the forecaster can play an important role on the skill of the final forecast. The difficulty is even stronger for tropical regions where in contrast to midlatitudes the atmospheric flow is weakly balanced resulting in a weaker predictability, especially for convective events. Also this process needs to be performed as quickly as possible.

Our objective is to present a framework aimed at guiding the forecasters task during the Specific Observation Period (SOP) of the AMMA international project focused on the study of the West African monsoon period (JJAS).

2. THE WEST AFRICAN SYNTHETC ANALYSIS/FORECAST

This proposed forecasting approach is based on the preparation of single synthetic maps that summarize all key features of the WAM analyzed or forecasted at a given time. These synthetic maps are named WASA and WASF for West African Synthetic Analysis and Forecast, respectively. The following 10 features are considered as important and figure on the WASA/F (Fig. 1) maps in order to capture the main characteristic of the situation and to forecast the weather.

1. The Intertropical Discontinuity: ITD hereafter.
2. The associated Heat-Low: HL hereafter

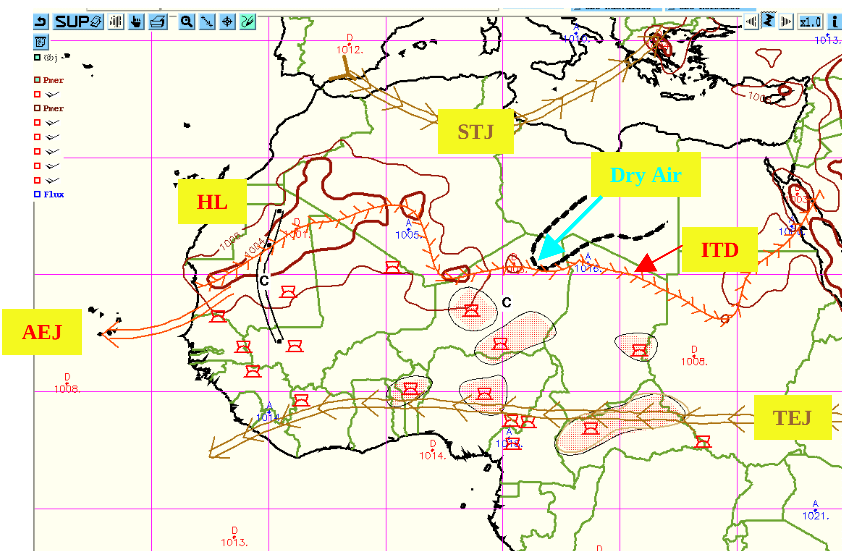

Figure 1. Illustration of the different key features figuring on a WASA/F.

3. SubTrop Jet and eventually the Polar Jet: STJ and PJ hereafter
4. Troughs extending from midlatitudes associated with the STJ or PJ
5. The Tropical Easterly Jet: TEJ hereafter
6. The African Easterly Jet: AEJ hereafter
7. Troughs and cyclonic centres associated with African Easterly Waves: AEW hereafter
8. Midlevel dry intrusions
9. Monsoon layer
10. Convective activity with the distinction between 3 cases:
    a. Suppressed convection areas
    b. Unorganized isolated convective cells
    c. Mesoscale Convective Systems: MCS hereafter and Squall Lines: SL hereafter

The first 9 key features are provided by NWP outputs available at ACMAD (Niger) through the Météo-France forecasting Synergie System (4 PC) fed by the RETIM-Afrique transmission link. They are drawn according to some rules. The model skill to forecast convective activity is poor in such tropical regions, so that the final forecast of MCSs is the result of the combination of all above 9 features, following some rules. For instance active fast moving MCSs need convective instability, high precipitable water, shear (or AEJ), dry air, vicinity of a through and of a vortex at 850 hPa. Figure 2 provide an example of a good forecast of 2 MCSs over West Africa on the 19 of July 2006, up to 2 days in advance.

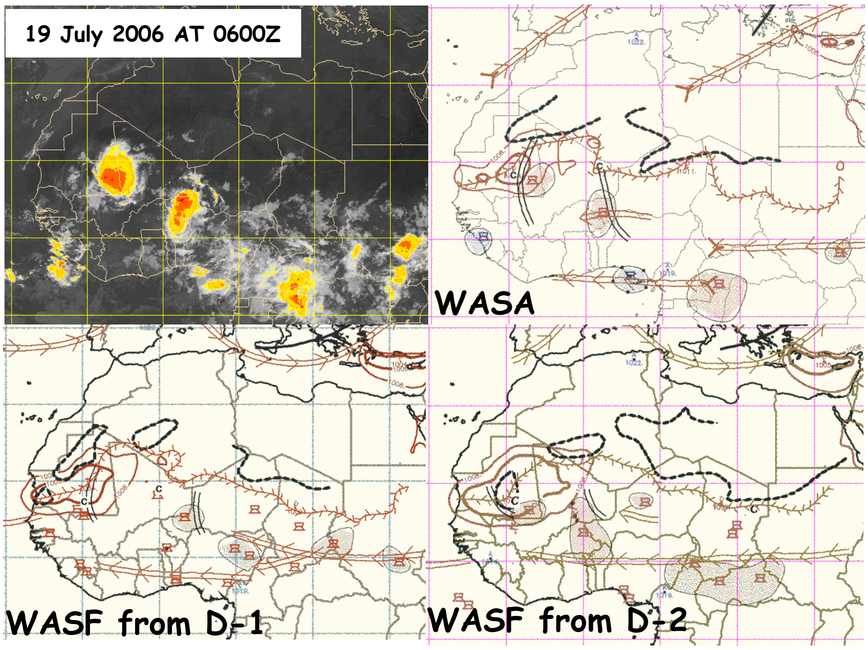

Figure 2. Example of WASA at 0600Z on the 19 of July 2006 as compared with the IR Meteosat image, and corresponding WASFs forecasted 1 and 2 days before.

3. SOME LEARNINGS FROM THE 2006 FORECAST DEMONSTRATION

The AMMA-Forecast team adopted this approach during the 2006 monsoon season, allowing testing it. During the THORPEX conference, we will evaluate the relevance of this approach as used during the 2006 summer demonstration experiment. Further steps will be to objectively evaluate the forecast skill using this approach. Also it appears that the method needs to be improved to define clearer drawing rules based on adequate and objective diagnostics.

We hope that this forecasting demonstration experiment will contribute to the development of a new forecasting method for Africa after its extension to the whole Africa by considering the whole year, not only the West African monsoon season.

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