

The Onset, Cessation and Dry Spells of the Small Rainy Season (Belg) of Ethiopia

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1. Introductions and Objectives

Ethiopia is characterized by three distinct seasons. These are locally known as Bega, (October to January) the dry season, Belg (February to May), the small rainy period and Kiremt, (June to September), the main rainy season in which about 85% to 95% of the food crops of the country are produced (Workneh Degefu, 1987). Rainfall during Belg season is highly variable in time and space and high maximum temperature values are common. (NMSA, 1996). The primary goals of this study are to determine the onset and cessation of this season (Belg) on the basis of objective criteria and also to identify its dry spell characteristics.

2. The Contribution of Belg Rainfall to the annual rainfall amount

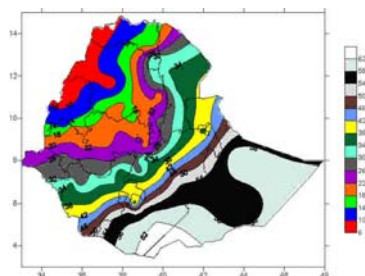


Fig.1 Contribution of Belg Rainfall to the annual rainfall amount over Ethiopia

3. Data

Daily rainfall data for 100 stations. Of the 100 stations, 78 stations are used in determining the onset and cessation of the small rainy season (Belg) on the basis of objective criteria and identifying the dry spells. The data recorded in this study encompasses data from 1971-2004. Seventy two percent of the stations have data record of at least 30years from (1971-2004). Other twenty eight percent of stations, which have data from 1981-2004, were included in order to improve the spatial coverage of the study.

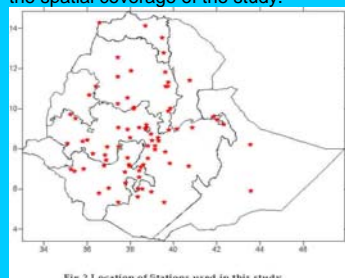


Fig.2 Location of Stations used in this study

4. Technique

Onset dates for all stations should satisfy;

-Rainfall total of 10 mm or more and a length of 3 days or more:

- No dry spell of duration of 9 days or no more in the next 30 days:
- Should occur with an earliest starting day of February 1:
- A threshold value of 1 mm (a rainy day is a day with 1mm or more rainfall).

The Cessation of Belg satisfies the following conditions;

- Water balance: -an earliest possible day of May 1, the capacities of soils to persist precipitation with water balance equal to zero is 100mm.

* Standardized evaporation data:-

<http://www.fao.org/ag/aql/aqlw/aqast/gis/index3>, FAO (2004), interpolating it to the daily format with the help of Instat software

* The occurrences of dry spells within the Belg season and for each months of the season were identified for a threshold of less than 1mm per day within a Belg season's months.

5. Results and Discussion

Mean dates of Onset, Cessation and dry spell of Belg:-

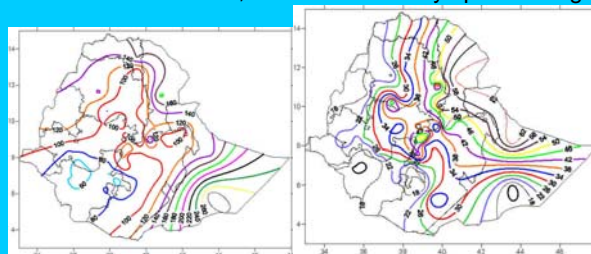


Fig.3 Mean Onset of Belg Season over Ethiopia

Fig.4 Standard Deviation of Belg Onset dates

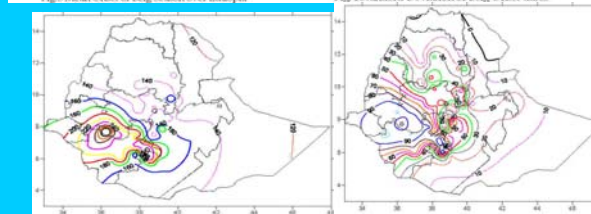


Fig.6 Mean Cessation date of Belg Season

Fig.7 Standard deviation of Belg Cessation dates

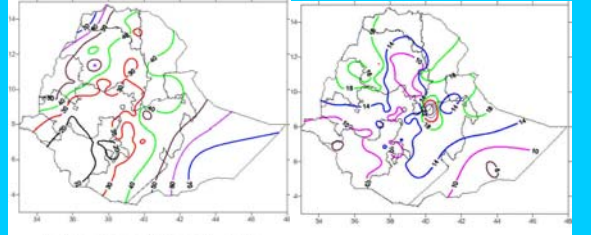


Fig.8 Mean Dry spells of Belg Season over Ethiopia

Fig.9 Standard deviation of Belg dry spell over Ethiopia

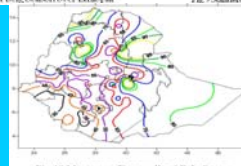


Fig.10 Eastern Dry spells of Belg Season

The Onset of Belg gradually advances northeastward from southwestern regions. The rains start in the last dekad of February over southwestern Ethiopia and cover much of the Belg-growing areas in the succeeding dekads. The onset of Belg is highly variable, with standard deviation across the country ranging from 12 to 65.

* The Belg rains leave from northeastern and central regions early in the first and second dekad of May, and cease over southwestern regions by late July (fig.6). The lowest variability of the cessation of Belg is over northern, northeastern and eastern regions, which have standard deviation of less than 15 days, while the highest variability is over western, southwestern, northwestern and central Ethiopia where standard deviation in cessation date range from 55-85 days. In the western and south ward the retreat of the rains is too late; rather it merges with the main rainy season.

Day of the Month	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	1-Jul	1-Aug	1-Sep	1-Oct	1-Nov	1-Dec
Day of the year	1	32	61	92	122	153	183	214	245	275	306	336

6. Reference

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