

A STUDY OF THE LUNAR TIDES
IN f_{O_2} AT FOUR AFRICAN STATIONS

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ABSTRACT

This thesis contains the results of work carried out to determine the lunar tide in f_oF_2 at 4 stations in Africa: Djibouti, Nairobi, Lwiro and Tamanrasset. A description of the method of analysis is also given.

The thesis is organised as follows:

In Chapter 1, a brief introduction to the ionosphere with particular reference to the F-region and its parameters is given, and the idea of lunar tides in the ionosphere is introduced with an explanation of the terms used to describe these tides.

In Chapter 2, previous work pertaining to lunar tides in the F-region at low latitudes is reviewed, and the main features of the tide in f_oF_2 at these latitudes are outlined.

In Chapter 3, a description of the two main computer programs used in the analysis is given.

Chapter 4 contains the results of the analysis. It is divided into sections each of which describes the variation of the tides with variation of a particular parameter. Chapter 4.1 states what data were used. Chapter 4.2 is a brief account of the latitudinal variation of the tides. Chapter 4.3 describes the variation of the tide in f_oF_2 with solar hour at the 4 stations. Chapter 4.4 gives the results of the analysis using only magnetically quiet days. Chapter 4.5 describes the tide in the different seasons of the year, and 4.6 describes the variation of the tides with solar epoch while retaining the division into seasons.

In Chapter 5, an attempt is made to relate the results described in Chapter 4 to the theories of the equatorial anomaly and of the lunar tide in $f_0 P_2$. An outline of a theory which explains the latitudinal variation of this tide is given.

Appendices are given which contain the complete computer programs and tables of the results.