ÖZET

Son yıllarda hızlı teknolojik ve bilimsel gelişmelerle birlikte konum belirlemesinde GPS (Küresel Konum Belirleme sistemleri) teknikleri önemli rol oynamaya başlamıştır. Askeri amaçlar için geliştirilen GPS teknolojileri, sivil uygulamalar için de kullanılmaya başlanmıştır; ve beraberinde güneş aktiviteleri, iyonosfer, troposfer gibi yan dalların da dikkate incelenmesine olanak sağlamıştır. Bunlara paralel olarak, GPS uydularına ilaveten GLONASS uydularının da hizmete girmesi ve hesap tekniklerinin gelişmesiyle yer hareketlerinin de milimetre düzeyinde ölçülmesine olanak sağlamıştır.


Bölüm 1’ de GPS sistemi, Bölüm 2’de GPS hata kaynakları ve Bölüm 4’ de İyonosfer ve - elektromanyetik dalgalar incelenmiştir. Ayrıca kayıtlar oluşturulması ve daha sonra verilerin işlenmesi bu bölümde yer almaktadır.


Hesaplama yöntemi uzun olmakla beraber, iyonogramlardan alınan gerçek h=f(N) diagramlarından yararlanarak evvela hmak yüksekliğin altında kalan tepe altı yoğunluğu hesaplanmıştır ve daha sonra Chapman tabakası modelinden yararlanarak TEC hesapları yapılmıştır. Bu yaklaşımanın daha sağlıklı sonuç verdiği belirlenmiştir.
ABSTRACT

With recent advances in technology and scientific research, GPS (Global Positioning Systems) have taken on a prominent role in determining location. Initially developed for military use, GPS has expanded into civilian uses and has brought focus to additional fields of research such as solar activity, ionosphere and troposphere. The addition of GLONASS satellites to the existing GPS satellites as well as advances in calculation methods have made it possible to measure tectonic movement at the millimeter level.

GPS technology is complex and brings together a variety of disciplines and technologies. Simply studying satellites and radio signals is not sufficient. The processing of said observations require additional scientific and technological know-how. Throughout the thesis and the subsequent implementation these technologies have been used for analyzing the acquired data and models.

The GPS system has been covered in Section 1, followed by GPS errors in Section 2 and a study of the Ionosphere and electromagnetic waves in Section 4. This section also covers the creation of records and processing of the data.

CORS-TR project has been implemented (2006 – 2009) in order to make the most rational use of the GNSS (Global Navigation Satellite System) comprised of GPS, GLONASS and the upcoming GALILEO systems. As covered in Section 3, the project, which was initiated on the 8th of May 2006, was completed successfully 31 months later on the 8th of December 2008. This project, which is vital for Turkey, has been carried out by Istanbul Kultur University (IKU). The military mapping agency “Harita Genel Komutanligi” (HGK) and the kadastre office “Tapu ve Kadastro Genel Mudurlugu” (TKGM) have been a part of this project as future clients. The project has been turned over to these agencies on May 2009 and have been run by them since.
Section 5 covers the work conducted via CORS-TR to calculate and analyze displacements in the Thracian peninsula. The results reflect the effects of multiple external factors. Among these factors are particles from the sun and X-rays. All external factors have been compared during this study.

Section 6 covers the TEC (Total Electron Content) calculations and analysis of various models via CORS-TR. It is well established that TEC, which is determined by the electromagnetic signals from satellites provides the electron content per m² between the satellite and the receiver. Variations have been observed on the TEC due to the different TID’s (Travelling Ionospheric Disturbance) electromagnetic path between satellite-receiver, which changes by the effect of free electrons.

Despite the longer calculation time, the tepe alti density below the hmak level has been determined by the true h=f(N) diagrams taken from the ionograms, followed by the TEC calculations using the Chapman layer models. It has been determined that this approach creates better results.