

Preliminary Study of Modeling the Precipitable Water Vapor Based on Radiosonde Data



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Outlines

1. Introduction

2. Regional T_m model

3. GPS Processing

4. Results

Introduction

"The Estimation of Atmospheric Water Vapour Using GPS Project"

The Scientific and Technological Research Council of Turkey (TUBITAK)

aims → the total zenith delay
the precipitable water vapour
the numerical models based on time and position

Regional T_m model

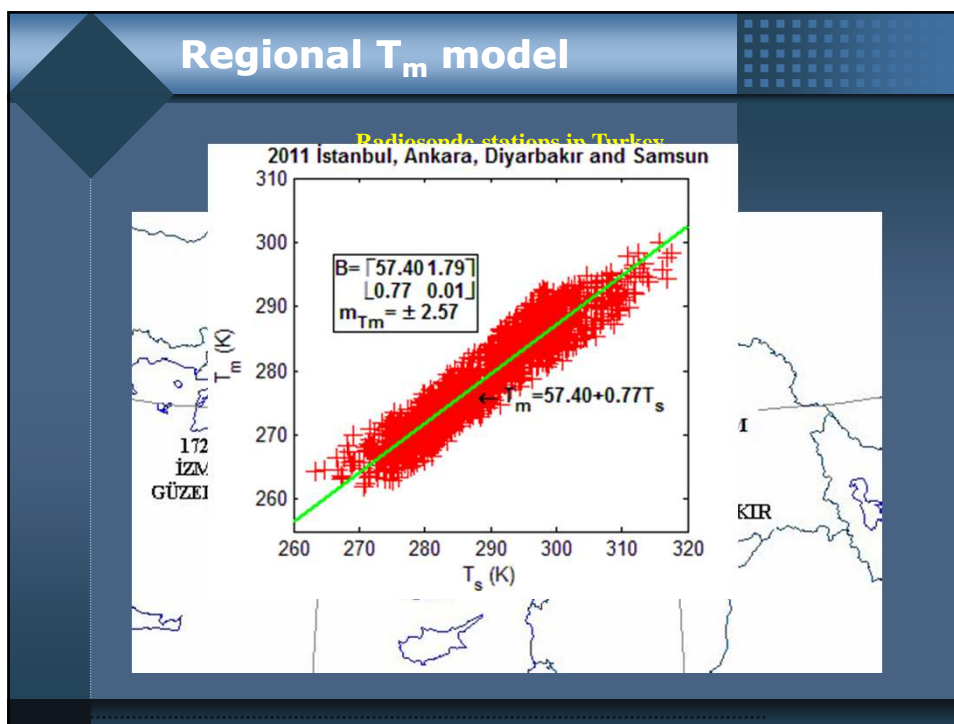
Istanbul, Ankara, Samsun and Diyarbakir radiosonde profile data

Radiosonde analysis algoritm (Matlab)

Linear regression method

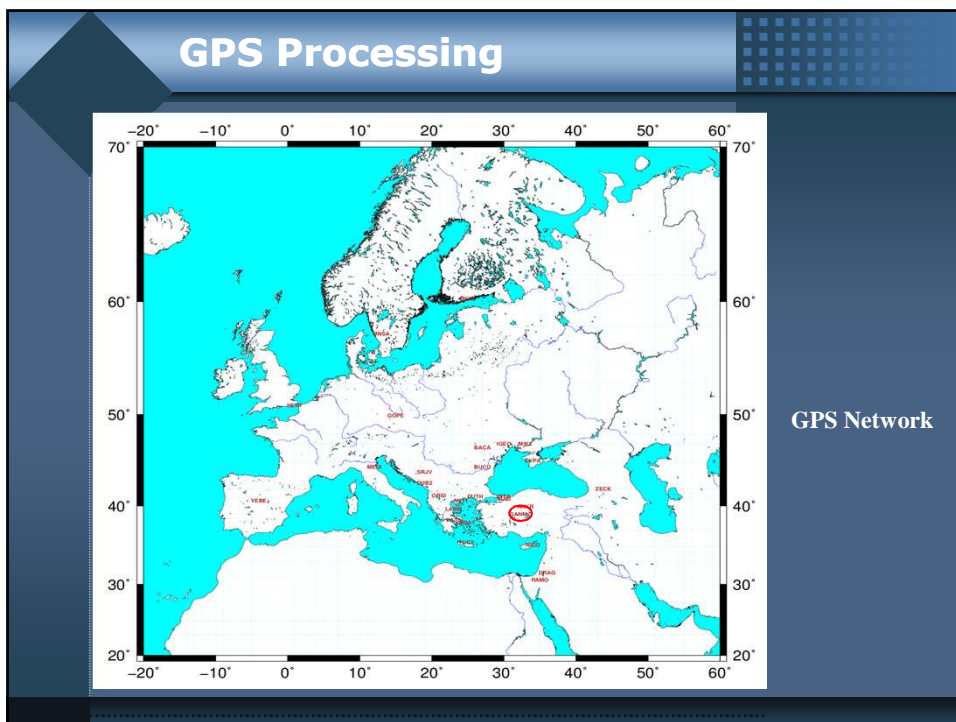
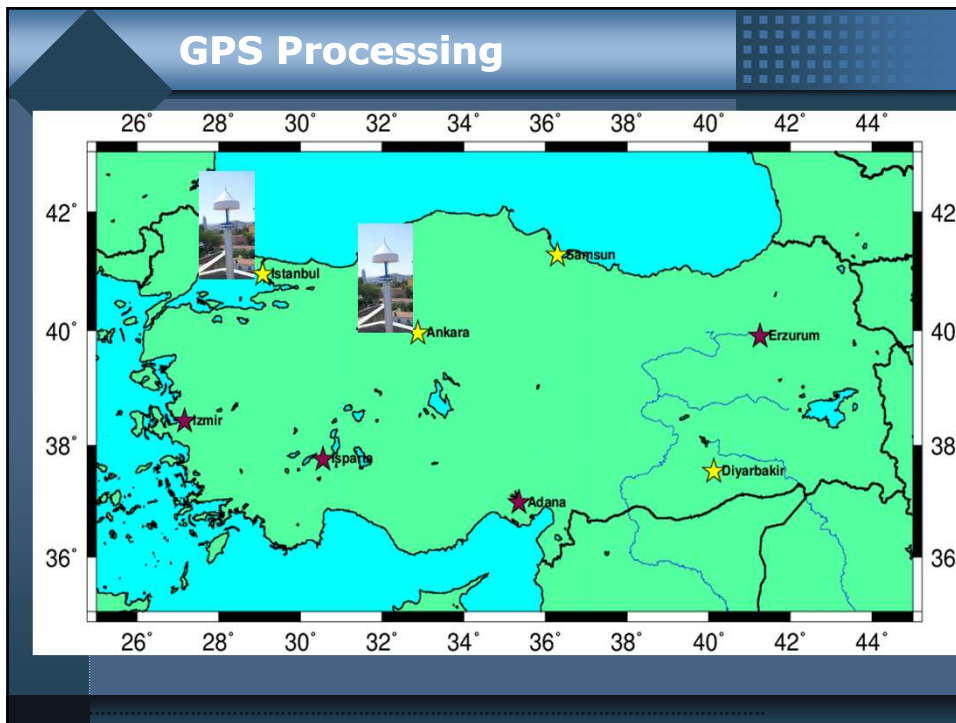
Regional T_m model

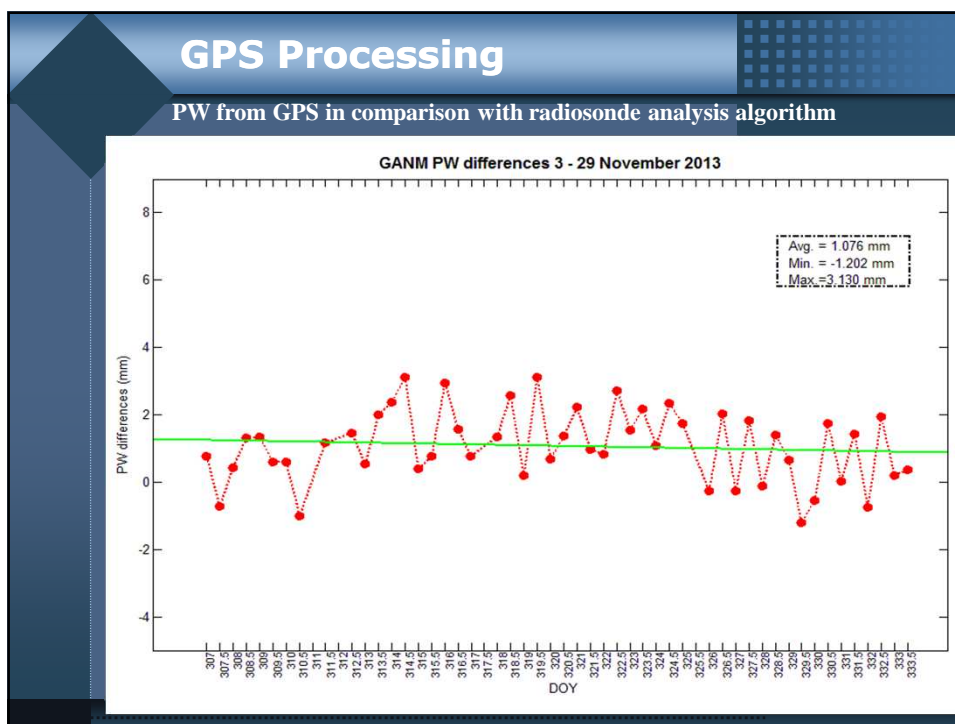
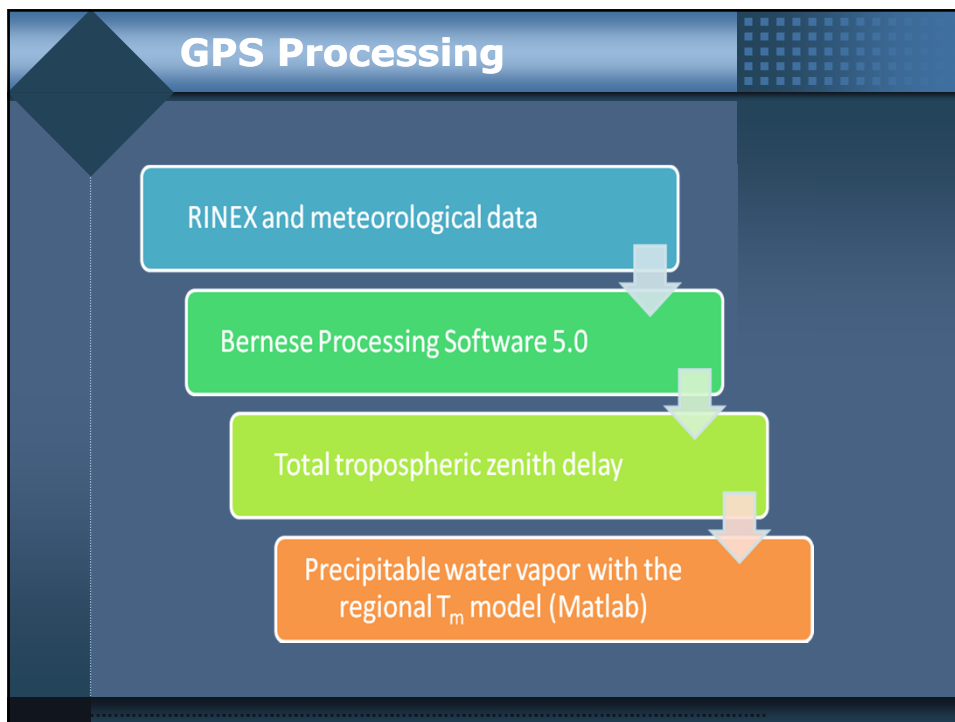
$T_s, T_m, ZTD, ZWD, PW, Q$

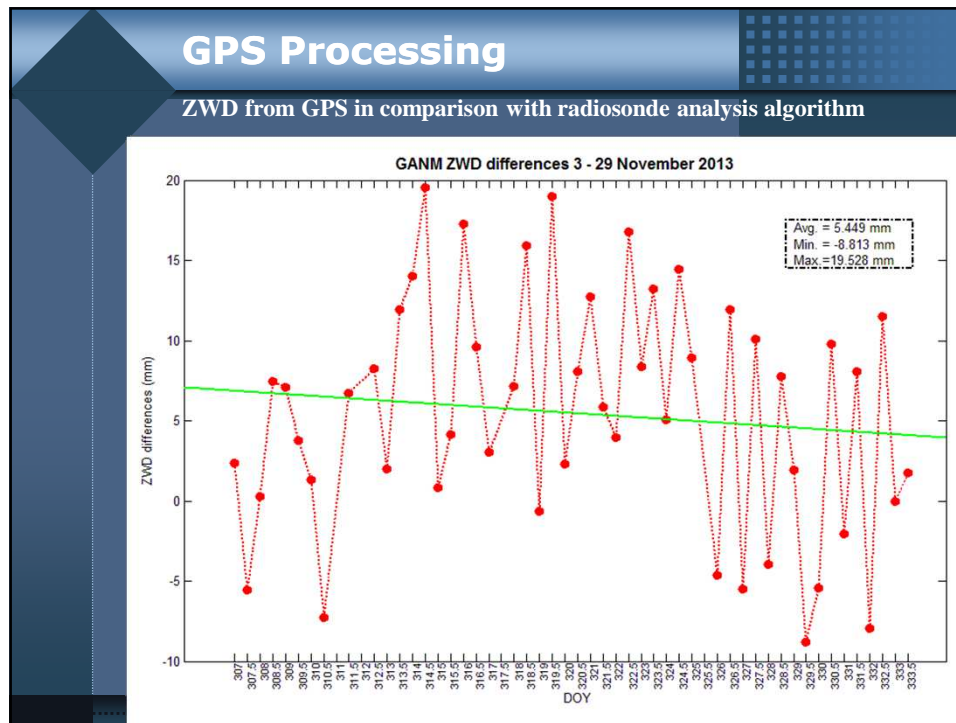


Introduction

| Researcher Name | T_m model (K) | RMSE (K) | Region |
|------------------------|-------------------------|----------|---------|
| Bevis et al (1992) | $T_m = 70.2 + 0.72.T_s$ | 4.74 | America |
| Liou et al (2001) | $T_m = 1.07.T_s - 31.5$ | 1.67 | Taiwan |
| Boutiouta et al (2010) | $T_m = 14.7 + 0.96.T_s$ | 4.89 | Algeria |







Conclusions

- ❖ $T_m = 57.4 + 0.77 \cdot T_s$
 $m_{T_m} = \pm 2.57$ } the region between Istanbul, Ankara, Samsun and Diyarbakır radiosonde stations
- ❖ The remaining radiosonde stations (Izmir, Isparta, Adana and Erzurum) \longrightarrow a T_m model for Turkey
- ❖ Istanbul and Ankara continuous GNSS stations (in the determination of the precipitable water vapour)
- ❖ ZWD and PW (to check accuracy and reliability of the radiosonde analysis algorithm)

