QIBLA DETERMINATION BY USING GNSS: A CASE STUDY IN CORUM CITY

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WHY

It is necessary to orientate especially the sanctuaries of the world to a determined direction. Within this context, Muslims should face towards Ka'b (that is the most sacred Muslim site in the world) in Mecca City of Saudi Arabia during their prayer obligation. The direction that Muslims face towards during prayer is called qibla and a wall niche, known as mihrab, of the mosques should orientate towards the qibla direction. The angle of the qibla direction is not fixed and depends on the location on the world (Figure 1).

HOW

For the validation of the prayer, the direction of the qibla should be determined precisely. There are numerous studies in this field and qibla direction is determined with different equipment and computation methods by using different approvals and approaches. Qibla direction can be determined mainly with:

- using qibla time,
- using qibla map,
- using astronomical instruments such as astrolabe,
- using trigonometric formula.

AIM

- In this study, qibla directions of selected mosques of Corum City which were constructed in different periods (i.e. between 15th and 21th century) were determined by using GPS measurement, which is a widely used satellite-based point positioning system.
- In order to provide this, coordinates of two points on the direction of the mosque’s wall representing the qibla direction were determined with satellite-based positioning method, i.e. GPS measurements and azimuth of qibla direction was calculated by using geometric formula.

STUDY

- On the other hand, real qibla directions of each mosque were calculated by trigonometric formulas (Figure 3). Determined existing and calculated real qibla angles were compared and the differences were interpreted according to the Islamic criteria. Besides, these differences were interpreted for the accuracies of the approaches used for the determination of qibla during the period of the mosque constructions.

CONCLUSIONS

When the results given in Table 1 are examined, the existing qibla directions of all mosques are acceptable according to the Islamic comment stated above. However, the differences at especially VeliPaşa, Kellegiz and Han mosques are respectively about 17.16 and 6 degree.

In the other hand, qibla directions of constructed mosques after the 2000s are highly accurate than former mosques.