8th International Conference on Asian and Pacific Coasts (APAC 2015)

Revisit tidal simulation of 1592 Hansan Naval Battle

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Abstract

Revisit tidal simulation of Naval Battle at Hansan on 8 July 1592 was conducted by involving the calendar day conversion and tidal prediction in several centuries ago. The Hansan battle is one of three victorious naval battles (Myungryang battle on 25 October 1597, Noryang battle on 16 December 1598 and this Hansan battle) led by Admiral Yi and also famous as the Crane Wing fleet formation during the battle. Conversion between lunar calendar day and solar calendar day before 1900 was taken from Korea Astronomy and Space Science Institute (KASI) because historical documents are written in the lunar calendar.

We attempt to reproduce tidal conditions during the most important battles of the Imjin War at Hansan to set up the regional tidal hindcast system of old times both by point and by numerical model simulation. The past topography rapidly changed by developments of coastal area assumed by old documentations and satellite images.

1. Introduction

The present work intends to hindcast tidal conditions of Naval Battle at Hansan on 8th of July 1592. The Hansan battle is one of three victorious naval battles (Myungryang battle on 25 October 1597, Noryang battle on 16 December 1598 and this Hansan battle) led by Admiral Yi and also famous in the Crane Wing fleet formation. The

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formation was often used on land, but not normally used at sea. Fig. 1 shows the photo of the panel drawn the diagram of Hansan Battle in the Jeseungdang , the memorial place of Admiral Yi.

The works involves in calendar day conversion and tidal prediction in several centuries ago. Most of tidal prediction programs are applicable after 1900s. Byun (2010) investigated the day conversion problems in IOS tidal package (Foreman, 1978) and Task-2000 tidal package (Bell et al., 1999). Conversion between traditional Korea lunisolar calendar day and Gregorian calendar day before 1900 was taken from Korea Astronomy and Space Science Institute (KASI). Also lots of information and routine for Julian and Gregorian Calendars are available. The Julian Calendar started in 45BC and Pope Gregory implemented the Gregorian Calendar in 1582. We used Fourmilab's conversion routine (http://www.fourmilab.ch/documents/calendar). Table 1 shows the key days for Traditional Korean calendar, Gregorian calendar date, Julian and Modified Julian Days.
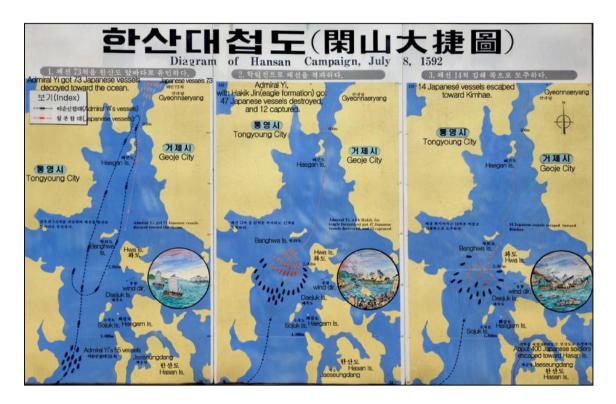

Fig. 1. Diagram of Hansan Campaign, July 8, 1592 (Hansando Jeseungdang).

Table 1. Date, Julian day and modified Julian day.

Date	Traditional Korean calendar	Gregorian calendar	Julian Day	Modified Julian Day
Julian starting day		B.C.4713/01/01 12h	0.0	-2400000.5
Gregorian starting day		1582/10/15 00h	2299160.5	-100840.0
Hansan Battle	1592/7/8	1592/8/14 12h	2302752.0	-97248.5
Myeongryang Battle	1597/9/16	1597/10/25 12h	2304650.0	-95350.5
Noryang Battle	1598/11/19	1598/12/16 12h	2305067.0	-94933.5
MJD starting day		1858/11/17 00h	2400000.5	0.0