



Surat Tugas

Nomor :67/UW-FTP/PS.SIP/IV/2018

Yang Bertanda tangan di bawah ini :

Nama : Ir. Cokorda Agung Yujana, M.T.
NIDN : 0829106201
Pangkat/Gol : Pembina/IVa
Jabatan : Ketua Program Studi Teknik Sipil Universitas Warmadewa

Dengan surat ini menugaskan kepada :

Nama : Putu Aryastana, S.T., M.Eng., M.Si
NIDN : 0802028201
Program Studi : Teknik Sipil

Untuk menjadi pemakalah dalam The 3rd Annual Applied Science and Engineering Conference (AASEC 2018) dengan judul "*Coastline Change Analysis and Erosion Prediction Using Satellite Images*" secara online yang diselenggarakan oleh Universitas Pendidikan Indonesia.

Demikian Surat Tugas ini dibuat untuk dapat ditindaklanjuti. Atas perhatiannya diucapkan terima kasih

Denpasar, 3 April 2018

Ketua Program Studi Teknik Sipil
Fakultas Teknik dan Perencanaan
Universitas Warmadewa



Ir. Cokorda Agung Yujana, M.T.

NIK.230700156

Coastline change analysis and erosion prediction using satellite images

Putu Aryastana^{1*}, I Made Ardantha¹, and Kadek Windy Candrayana²

¹Universitas Warmadewa, Department of Civil Engineering, Denpasar-Bali, Indonesia

²Udayana University, Master Student Department of Civil Engineering, Jl. PB Sudirman, Denpasar, Indonesia

Abstract. The study of monitoring and analysis of coastline change and erosion prediction has been widely used satellite imagery. Satellite data that is often used in monitoring studies and analysis of coastline changes are Landsat, Quickbird, Allos, SPOT, IKONOS, etc. The aim of study is to determine an average of coastline change and average of coastal erosion in coastal area of Tabanan Regency, Bali Province, Indonesia by using two kind satellite are SPOT 5 in 2009 has a spatial resolution of 10 m (multispectral) and SPOT 6/7 in 2015 has a spatial resolution 1.5 m. This research contributes to local government and central government as a database in decision making for coastal area management. The result of analysis shows the average of coastline change in Tabanan regency is 13.96 m and the average rate of coastal erosion is 1.99 m/year. The coastline movement or erosion has caused the morphological changes.

1 Introduction

Shoreline change analysis and prediction are important for integrated coastal zone management, and are conventionally performed by field and aerial surveys [1]. Coastline mapping can be defined by direct field measurement, aerial photography analysis and remote sensing analysis by using satellite imagery [2]. Technological developments have led to the use of satellite imagery in coastline change analysis [3].

Satellite data were utilized for coastline change analysis and erosion prediction in many researches. For example IRS satellite data were used to calculate the shoreline change rates, coastal erosion and accretion in southern coastal Tamil Nadu of India[4]. Multitemporal remote sensing data of Landsat MSS and TM from 1976 to 2000, totaling twenty scenes, were used to examine the changing pattern of accretion and erosion of the modern Yellow River subaerial delta with GIS tools [5]. Digital Orthophoto Quarter Quadrangles (DOQQs) and black and white aerial photographs were used to calculate shoreline change rate in Neuse River Estuary, USA [6].

Landsat MSS image of 1979, Landsat TM and ETM+images of 1990 and 2000, SPOT image of 2003 and the topographic map 1:100,000 of 1966 and a nautical map scale 1:150,000 of 2003 were utilized to analysis coastline change detection of the Pearl River Estuary, China [7]. Landsat MMS, Landsat TM and SPOT-4 were utilised to estimate the spatio-temporal changes that occurred in the coastal zone between Damietta Nile branch and Port-Said between 1973 and 2007 [8].

Landsat imagery between 2000 and 2014 were utilized to evaluate of annual mean shoreline position at El Saler Valencia, Spain [9]. Combination aerial photographs and satellite imagery (IKONOS, Quickbird, Worldview2 and Geoeye-1) were used to interpreted shoreline change at Wotje Atoll, Marshall Islands [10]. SPOT image was used to evaluate shoreline in Progreso, Yucatán, México [11]. SPOT 5 and SPOT 6/7 were used to analysis the average of coastline changes from 2009 and 2015 at Buleleng Regency, Bali Province, Indonesia [3].

The objective of this research is to analysis the average of coastline changes and average rate of coastal erosion in Tabanan Regency based on SPOT 5 and SPOT 6/7 image.

2 Methods

2.1 Satellite data

Satellite imagery was utilized are SPOT 5 image in 2009 has a spatial resolution of 10 m (multispectral) and SPOT 6/7 image in 2015 with resolution up to 1.5 m.

2.2 Study location

The research sites were conducted along the coast in Tabanan Regency, Bali Province, Indonesia (Figure. 1). Geographical boundary of coast is X = 270517.1308, Y = 9063446.9826 to X = 290829.5643, Y = 9044732.1720.

* Corresponding author: aryastanaputu@yahoo.com