연안 항행안전 위험시설 정보 취득 및 활용 기법

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요 약 : This study attempts to establish a system extracting and monitoring cultural grounds of seaweeds (lavers, brown seaweeds and seaweed fulvescens) and abalone on the basis of both KOMPSAT-2 and Terrasar-X data. The study areas are located in the northwest and southwest coast of South Korea, famous for coastal cultural grounds. The northwest site is in a high tidal range area (on the average, 6.1 m in Asan Bay) and has laver cultural grounds for the most. An semi-automatic detection system of laver facilities is described and assessed for spaceborne optic images. On the other hand, the southwest cost is most famous for seaweeds. Aquaculture facilities, which cover extensive portions of this area, can be subdivided into three major groups: brown seaweeds, capsosiphon fulvescens and abalone farms. The study is based on interpretation of optic and SAR satellite data and a detailed image analysis procedure is described here. On May 25 and June 2, 2008 the TerraSAR-X radar satellite took some images of the area. SAR data are unique for mapping those farms. In case of abalone farms, the backscatters from surrounding dykes allows for recognition and separation of abalone ponds from all other water-covered surfaces. But identification of seaweeds such as laver, brown seaweeds and seaweed fulvescens depends on the dampening effect due to the presence of the facilities and is a complex task because objects that resemble seaweeds frequently occur, particularly in low wind or tidal conditions. Lastly, fusion of SAR and optic spatial images is tested to enhance the detection of aquaculture facilities by using the panchromatic image with spatial resolution 1 meter and the corresponding multi-spectral, with spatial resolution 4 meters and 4 spectrum bands, from KOMPSAT-2. The mapping accuracy achieved for farms will be estimated and discussed after field verification of preliminary results.

핵심용어 : Seaweed, Detection, Laver, SAR, KOMPSAT-2

1. INTRODUCTION

As farm facilities continue to increase, a policy is needed to maintain a proper level of production through control of unlicensed 燔 氈攀瘀攀氈 rms and stabilization of supply and demand. To put such a policy into effect, it seems that continuous monitoring of laver farms is necessary.

To manage inshore laver farms efficiently, we need to make investigations into actual sizes of farming facilities; probably, the most efficient method is by use of satellite. However, because laver farms have different types and sizes of facilities by region, investigations should be made on the basis of field data. (Yang & Park, 2006)

TerraSAR-X is a multi-role SAR satellite with active phased array antenna technology of X-band and enables very high image resolutions of up to one metre, independent of daylight or cloud cover. The satellite can work in three different operational modes: In spotlight mode, the radar image covers an area of 5-10 by 10 kilometres. This is done with a maximum resolution of up to one metre. In strip-map mode, the satellite sweeps a corridor with a width of 30 kilometres and a maximum length of 1,500 km. The resolution is 3 metres. In scan SAR mode, a corridor with a width of 100 kilometres and a maximum length of 1,500 km is swept with a resolution of 16 metres.

Therefore, in this study optic and SAR satellite data was used to fine a method for monitoring of coastal faming facilities. And a fusion technique was applied using KOMPSAT-2 (1-m resolution) and TerraSAR-X spot mode.

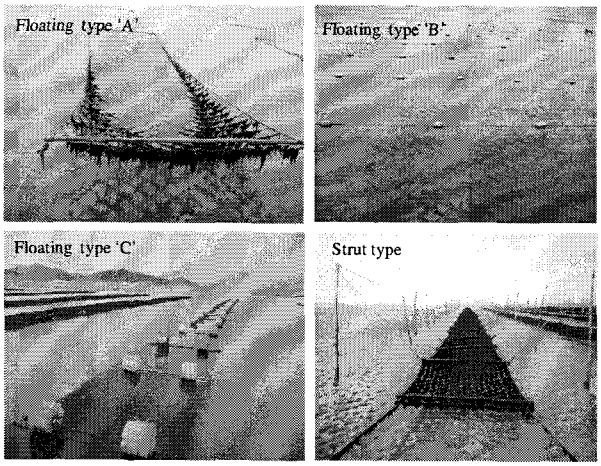

Figure 1. Types of laver farm facilities.

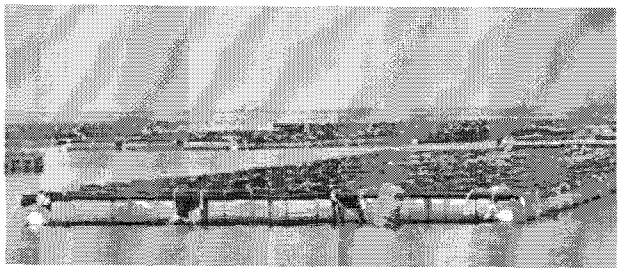

Figure 2. View of abalone farm facility.

As shown in Fig. 1, the kinds of laver farm facilities are diverse. Floating type A is used in Hwaseong, Ansan, and so forth, floating type B in Jindo, Haenam, Wando, Goheung, Jangheung, and so forth; these types are found in most coastal areas, with about 1.8 to 2.4m wide and 40 to 200m long. Floating type C is seen mainly in Gunsan, Seocheon, and Gangseogu in Busan. Strut types are set up in tidelands of Sinan and Mokpo sea areas, as shown in pictures (Yang & Park, 2006).

A view of abalone farm facility is shown in Fig. 2. In the aquaculture of South Korea, seaweeds and shell fishes account for about 95%. The study areas are located in the northwest and southwest coast of South Korea, famous for coastal cultural grounds.

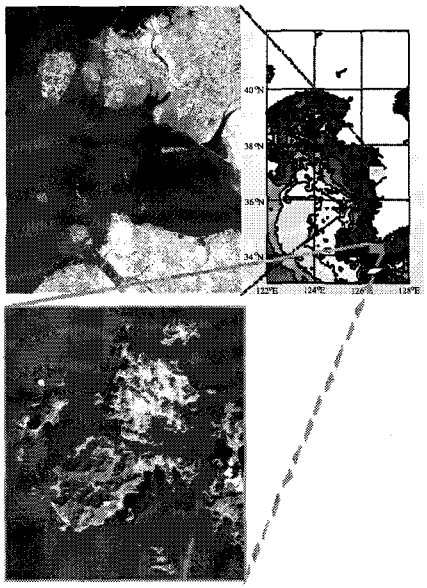

Figure 3. Research area for culturing farms, Korea. Asan Bay (Left), Dadohae(Right).

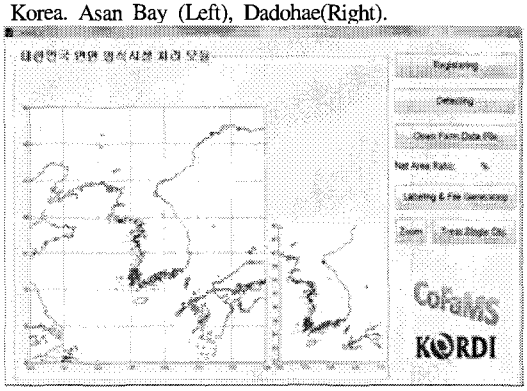

Figure 4. Main Module of CoFaMS.

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