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Related Research on Remote Sensing Monitoring Methods of Canola

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Abstract. Since the 21st century, The mossy green tide disasters of different scales often occur along the coast of Qingdao's summer coastline. This environmental problem has greatly affected the balance of the local marine ecology and, to a certain extent, affected the fisheries in Qingdao. In order to make the canola salvage more scientific and more rapid, in recent years, the research on remote sensing monitoring of canola has been flourishing. This paper summarizes and compares the principles and effects of microwave remote sensing monitoring in canola monitoring. The shipborne radar method monitors the growth of canola during June 2012 to determine the feasibility of remote sensing monitoring of canola.

1. Introduction

In recent years, large-scale green tide disasters have occurred in the Yellow Sea area of China for many consecutive years, while the dominant algae species of the green tide are mainly canola. The large-scale breeding of canola often occurs in the spring and summer seasons. The main cause is the eutrophication of seawater, due to the discharge of industrial and domestic wastewater such as estuary and inner bay, and the seawater exchange capacity of the Jiaozhou Bay. Poorly, the elements required for nitrogen, phosphorus and other plants in the waters along the Jiaozhou Bay in Qingdao are eutrophicated. In addition, the aquaculture cages in Lianyungang and other places tend to grow canola, and the algae body sheds with the current to form a floating proliferation group, that is, the phenomenon of green tide.

The outbreak of canola has a great impact on the diversity of marine ecosystems. The outbreak of canola causes a large number of other planktons to die out, and the changes in biological species affect the water quality changes in the outbreaks, thus affecting other marine organisms. [1-3]

At present, the monitoring of canola has become a focus of widespread scholars. The scientific monitoring of canola helps to further understand the cause and development of canola, and provides a guiding basis for the salvage and management of canola. Remote sensing technology has the advantages of all-weather, large-scale and multi-angle. Reasonable use of remote sensing monitoring methods can accurately grasp the growth of canola, and combine with the surface flow field and wind field data of the sea area to make a reasonable prediction for the development of canola.

In recent years, satellite remote sensing technology is mainly used for remote sensing monitoring of canola. The types of satellites can be divided into optical remote sensing and microwave remote sensing. The specific monitoring principle has a great relationship with the growth state of canola in seawater.

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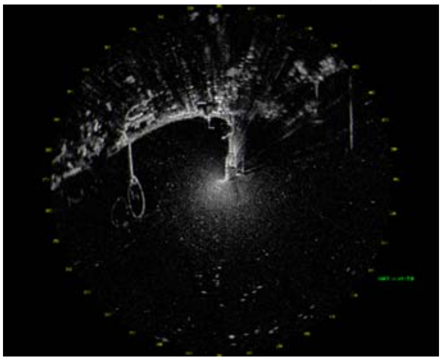
For the monitoring of canola floating on the surface of water, microwave remote sensing is mainly distinguished by the difference in dielectric constant between seawater and canola. The difference in dielectric constant results in the gray value and backscattering coefficient obtained by the echo signal. There is a big difference. Based on such conditions, data calibration is performed according to the frequency of the radio frequency signal, and the moss information is obtained by threshold division of the echo image.

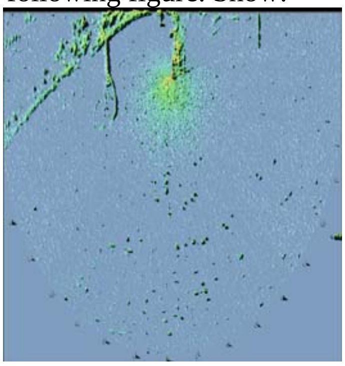
It is still difficult to monitor the canola suspended in the water body, mainly because the information extraction will be affected by the suspended particles in the water film layer, which causes the echo calibration to not form a relatively stable state. At present, the main use is The absorption and elastic scattering coefficients between moss, chlorophyll, seawater, suspended particles, etc. are modeled [4], and the empirical equations are used to approximate the distinction. However, since the usually suspended canola is often small in scale, the impact on the water body is relatively small, and as it grows, it floats up and floats.

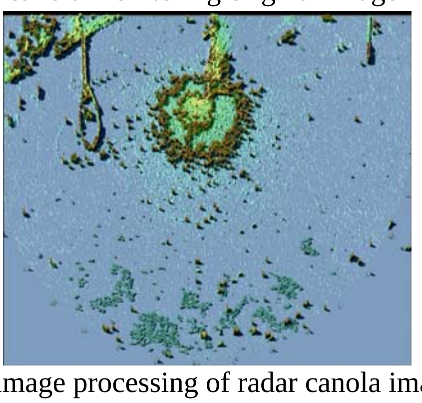
In addition, this paper adopts the method of shipborne radar for remote sensing monitoring of canola. The advantage of shipborne radar compared with satellite remote sensing is that the resolution of the obtained image is higher. According to the power of the radar transmitter, the resolution is the largest. Up to 0.5m*0.5m. In addition, the data transmission time is short, and the monitoring conditions are relatively flexible, which is more instructive for the ship's canola fishing. The radar used in this monitoring is the US Speery radar with a wavelength of 3cm, a beamwidth of 1°X 23°, and a transmission power of 25kw.

2. Organization of the Text

The shipborne radar was used to monitor the moss in the Yellow Sea from June 5th to 21st, 2012. The radar used in this monitoring is the US Speery radar with a wavelength of 3cm, a beamwidth of 1°X 23° and a transmission power of 25kw. According to the results of the collection at 15:26 on June 13, 2012, the location of the radar at that time was (36°40'19.08"N, 121°14'22.10"E). The remote sensing information was extracted for the radar scan, as shown in the following figure. Show:


(I) Radar canola monitoring original image


(II) Radar Brassica Surveillance Image Preprocessing


(III) Radar image processing of radar canola image

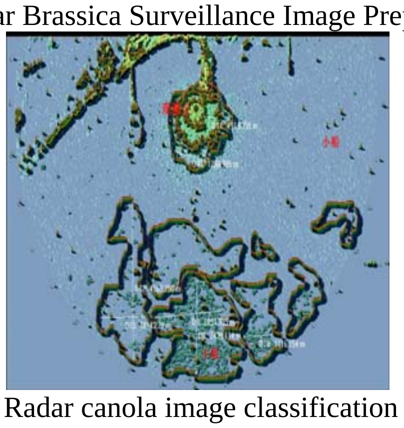

(IV) Radar canola image classification processing

Figure 1. Processing results of the collection results at 13:55 on June 13, 2012

The above figure shows that the area indicated by green in Fig. IV obtained by image processing, spatial filtering processing, image classification processing, etc., obtained by the image processing of the original picture of the radar is the area of the moss, and the circled part is deep. Green is the dense mossy distri

-bution area. Figure I is the original image of the radar obtained by using the radar imaging range of 3 na

-utical miles. Figure II is the first image processing of the image, and the color difference is displayed for the target of different echo signal strength. Figure III is the spatial filtering process for the image. Differe

-ntiating the same echo intensity signal, the error judgment of clutter, ship, etc., the brown area in the figure shows the clutter and ship echo signal area, the near center point clutter signal interference is dense, and the position away from the center point is Ship echo signal; Figure IV classifies the image information, and performs pixel count and size calibration on the canola area of the moss-dense area (dark green display area in the figure). According to statistics, the total distribution of canola in the thick moss area is about 3.2km2. There are three areas of canola dense area in the picture. The area is 3 in density, the area 2 is 8+, and the area is 3 in density. The overall salvage area of the moss is consistent with the radar-intensive area.

3. Conclusion

Remote sensing monitoring of canola has become the main method and command means for monitoring canola disasters, making the salvage cleaning of canola more targeted and directional, greatly reducing the labor and financial resources of canola cleaning. In addition, the use of remote sensing technology combined with sea current and wind fields can also provide early warning for canola disasters.

In this paper, X-band radar is used to image the distribution of canola, and the results are relatively accurate. For the monitoring of canola by remote sensing means, attention should be paid from the following two aspects:

(1) The combination of multi-platform and multi-data sources is perfected for canola monitoring.

The large limiting factor of shipborne radar canola monitoring is the limitation of shipborne radar power and ship's navigation distance. The relatively accurate imaging distance is usually 1.5-3 nautical miles, which is difficult to meet the monitoring of the overall growth of canola. Therefore, the use of multi-platform linkage monitoring is the development trend of future research. Satellite remote sensing and shore-based radar were used to monitor the overall extent of canola, and shipborne radar was used to guide salvage in the hard-hit areas of canola. Multi-platform linkage monitors the growth of canola.

(2) Establishing an intelligent platform for canola remote sensing monitoring

At present, the monitoring information for canola is relatively simple, and should be combined with the corresponding GIS, AIS and other information to form a more intuitive imaging platform for canola remote

Sensing monitoring. In addition, combined with the corresponding wind field and sea current data, the prediction of canola migration is also the key target of the next step.

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