

# 10 remote sensing of surface water springerlink

## Download Complete File

### Remote Sensing of Water\*\*

Remote sensing is a technique used to gather information about objects or areas from a distance, without direct physical contact. When applied to water, remote sensing can provide valuable insights into various aspects of water resources, such as water quality, surface water extent, and groundwater levels.

### Remote Sensing of Water Turbidity

Water turbidity refers to the cloudiness or haziness of water caused by the presence of suspended particles. Remote sensing techniques can be used to measure water turbidity by analyzing the way light interacts with water bodies. Sensors mounted on satellites or aircraft can detect changes in water absorption and scattering properties, which can be used to estimate turbidity levels.

### Applications of Remote Sensing in Water Resources

Remote sensing plays a crucial role in various applications related to water resources management:

- **Water Quality Monitoring:** Remote sensing can detect and monitor water pollutants, such as sediments, nutrients, and harmful algal blooms.
- **Surface Water Detection:** Remote sensing techniques, such as optical and radar imagery, can identify and delineate surface water bodies, including rivers, lakes, and wetlands.

- **Groundwater Exploration:** Remote sensing data can provide information about subsurface aquifers and groundwater recharge zones.
- **Water Use Efficiency:** Remote sensing can be used to monitor crop water use and identify areas with inefficient irrigation practices.

### **Physical Basis of Remote Sensing of Water**

The physical basis of remote sensing of water lies in the interaction between electromagnetic radiation and water molecules. Water absorbs and scatters light in specific wavelengths, depending on its properties, such as temperature, salinity, and the presence of suspended particles. These interactions can be detected and analyzed by remote sensing sensors.

### **Remote Sensing Techniques for Water Quality**

Various remote sensing techniques are employed to assess water quality:

- **Optical Imagery:** Sensors record visible, near-infrared, and thermal infrared wavelengths to identify water bodies and detect pollution indicators, such as sediment plumes and algae blooms.
- **Multispectral Imagery:** Sensors measure reflectance in multiple wavelengths to distinguish between different types of water bodies and pollutants.
- **Hyperspectral Imagery:** Sensors collect data in hundreds to thousands of narrow wavelength bands, providing detailed information about water composition.

### **Method of Surface Water Detection**

Surface water detection using remote sensing involves analyzing the spectral characteristics of objects on the Earth's surface. Water bodies typically have a high reflectance in the near-infrared (NIR) and mid-infrared (MIR) bands and a low reflectance in the visible band. By comparing these reflectance values, algorithms can differentiate between water and other land cover types.

### **How is Remote Sensing Used in Hydrology?**

Remote sensing techniques are widely used in hydrology to study various aspects of water systems:

- **Precipitation Estimation:** Satellite-based sensors measure the properties of clouds to estimate rainfall and snowfall.
- **Streamflow Monitoring:** Remote sensing data can be used to track water levels in rivers and estimate streamflow.
- **Snowpack Monitoring:** Remote sensing images help map the extent and depth of snowpack, which is crucial for predicting water availability in spring.

### How is Remote Sensing Used in Groundwater?

Remote sensing can provide valuable information about groundwater resources:

- **Aquifer Exploration:** Satellite gravity and magnetic data can help identify potential aquifers and recharge zones.
- **Groundwater Level Monitoring:** Interferometric synthetic aperture radar (InSAR) can measure ground subsidence, which can indicate groundwater depletion.
- **Groundwater Quality Assessment:** Remote sensing techniques can detect land use changes and identify potential sources of groundwater contamination.

### Water Use Efficiency Using Remote Sensing

Remote sensing can be used to assess water use efficiency in agriculture:

- **Crop Water Stress Monitoring:** Remote sensing data can detect crop water stress by analyzing vegetation indices, which reflect plant health.
- **Irrigation Optimization:** Remote sensing can help farmers optimize irrigation schedules by providing information about soil moisture and evapotranspiration.
- **Drought Monitoring:** Satellite-based remote sensing can track the onset and severity of droughts.

## Use of Remote Sensing in Hydrology

Remote sensing has numerous applications in hydrology:

- **Flood Mapping:** Remote sensing data can be used to create flood inundation maps and identify areas at risk of flooding.
- **Erosion Monitoring:** Remote sensing techniques can monitor changes in land cover and detect areas prone to soil erosion.
- **Water Resource Planning:** Remote sensing data provides a comprehensive view of water resources, enabling informed decision-making.

## Use of Remote Sensing in Water Pollution

Remote sensing plays a vital role in water pollution monitoring:

- **Oil Spill Detection:** Satellite-based sensors can detect oil spills on water surfaces by analyzing changes in surface reflectivity.
- **Pollution Source Identification:** Remote sensing data can identify land use features and activities that contribute to water pollution.
- **Water Quality Regulatory Enforcement:** Remote sensing data can be used for enforcing water quality standards and regulations.

## Ocean Remote Sensing

Ocean remote sensing involves the use of satellites and sensors to study the oceans:

- **Sea Surface Temperature Measurement:** Satellite-based infrared sensors measure sea surface temperature to monitor ocean currents and detect El Niño events.
- **Sea Ice Monitoring:** Remote sensing data can map sea ice extent and thickness, providing insights into climate change and polar ecosystems.
- **Ocean Color Measurement:** Sensors mounted on satellites record the color of the ocean to estimate phytoplankton abundance and ocean productivity.

## Remote Sensing of Water Vapor

Remote sensing techniques can detect and measure water vapor in the atmosphere:

- **Microwave Radiometers:** Satellite-based microwave radiometers measure the thermal radiation emitted by water vapor to determine its concentration and distribution.
- **Lidar Systems:** Lidar (Light Detection and Ranging) systems use pulses of laser light to measure the range to water vapor molecules in the atmosphere.
- **Raman Spectroscopy:** Remote sensing sensors can measure the Raman scattering signal from water vapor to retrieve its concentration and isotopic composition.

essays on revelation appropriating yesterdays apocalypse in todays world heat sink  
analysis with matlab j2ee open source toolkit building an enterprise platform with  
open source tools java open source library bushmaster manuals 1967 impala repair  
manua shoot for the moon black river pack 2 honda shuttle repair manual suzuki vz  
800 marauder 1997 2009 service repair manual download ap world history chapter  
18 solutions manual organic chemistry 3rd edition smith security trainer association  
manuals 2002 2004 mazda 6 engine workshop factory service repair manual 01  
polaris trailblazer 250 manual a manual of practical zoology invertebrates devils  
demons and witchcraft library abdominal access in open and laparoscopic surgery  
audiovox ve927 user guide nissan micra service and repair manual kenget e  
milosaos de rada less waist more life find out why your best efforts arent working  
answers to the top 21 weight loss questions strategies and tactics for the finz  
multistate method emmanuel bar review vauxhall astra g service manual mosbys  
medical terminology memory notecards 2e ship or sheep and audio cd pack an  
intermediate pronunciation course jaguar manual s type cbip manual for substation  
layout soap progress note example counseling  
hondatrax 200service manual1984pagelarge howtobe abloggerand vloggerin10  
easylessonslearn howto createyour ownblog vlogor podcastand getitout inthe

blogospheresuperskills mindfulnessbasedtreatment approachesclinicians guideto  
 evidencebase andapplications practicalresources forthemental healthprofessional  
 bywilliamr stanekactive directoryadministrators pocket consultant1st  
 editioncanonmf4500 mf4400d500series servicerepairmanual fujiaf 300minimanual  
 k53learnersquestions andanswers 1988yamaha9 9esgoutboard  
 servicerepairmaintenance manualfactorybest servicemanuals for2000mb  
 sl500materialscharacterization forprocess controlandproduct conformityintroduction  
 tomethods fornondestructivecharacterization ofmaterials duringproduction  
 operationandinspection accorhotel standardsmanual marinespirits johneckhardt  
 rcbspartner partsmanualfundamentals offinancialmanagement 12thedition  
 bybrighamand houstonsolution manualtestermode ll thermodynamicssolutionsmanual  
 johnsonoutboard manualdownload ebooksvs paperbooks theprosand consmetal  
 formingtechnologyand processmodellingtoyota supramk41993 2002workshop  
 servicerepairmanual citroensaxovts manualhatchback aebexamboard pastpapers  
 saturnv apollolunar orbitalrendezvous planningguidemiddle schoolyoungtimer  
 adventuresintime series1 middleschoolbooks girlsmiddlegrade booksgirlsadventure  
 fantasyscience fictionfriendship funtime travelages 912 ages1014  
 1995mitsubishimontero ownersmanualpiaggio x8manual tallertoyota2l enginerepair  
 manuelleccion5 workbookanswers houghtonmifflincompany manualredone  
 espanolvw polodiyguide hondastream2001 manualblacketts warthem  
 whodefeatedthe naziuboatsand broughtscienceto theartof warfarehowto puzzlecach  
 caterpillar416 operatorsmanual