

# USING HYMAP TO DETECT EFFLUENT INTO RESERVOIRS IN SHENZHEN CHINA

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**Abstract:** Freshwater resources are regarded as the foundation Urban development and assure the sustainable prosperity for the city. The contaminations of fresh water in reservoirs can threaten safety of people directly and force the Industrial processes to be suspended. Therefore, developing a method to detect the potential locations where contaminated water drains off into the reservoirs efficiently and precisely is a challenging task but in urgent need. In this research, we used the air-borne sensor Hymap to get the hyperspectral data of Shenzhen. Synchronously, we measured the spectrums of the water samples in reservoirs in Shenzhen China by ASD Field Spec Pro and got the water quality parameters of the samples by Chemical Analysis. Calculating the correlation of water quality parameters and the reflectance of each band and the result indicates two points. Firstly, there are low correlations between reflectance in single band and all the water quality parameters (Suspended Solid(SS),Total Nitrogen(TN),Ammonia Nitrogen(AN), Total Phosphorus (TP), Chemical Oxygen Demand (COD),Biochemical Oxygen Demand (BOD5)),so the six water quality parameters retrieved by reflectance of single band can be with enormous deviation. Secondly, spectrums in some ranges have the similar correlation to all the six water quality parameters. Absorption peaks and reflectance peaks in 510~617nm, 648~700nm, 684~730nm, 757~767nm, 783~834nm, 988~1155nm are suggested to be closely related to all the six water quality parameters. The ratio of peak areas in 684~730nm and 783~834nm can be used to distinguish the clear water and polluted water clearly. Establish the equations of the areas of peaks and the water quality parameters , the result reveal that the area of peaks have ability to retrieve water quality parameters such as TN,COD and BOD5 which were considered unable to be retrieved form water spectrum. Applicating the methods to the Hymap data, we find the retrieve doesn't work for the Hymap data has low spectral resolution but the ratio of Hymap band 25(800nm) to band 19(710nm) is still useful for polluted water identifying. Using the ratio we found some locations on Hymap image where contaminated water drains off into the reservoirs. The result shows (1)The contents of SS,TN,AN,TP,COD and BOD5 don't relate to any single-band reflectance.(2) TN,COD and BOD5 can be retrieved form spectrum using the areas of absorption peaks and reflectance peaks in 510~617nm, 648~700nm, 684~730nm, 757~767nm, 783~834nm, 988~1155nm. (3)The band 19 and band 25 of Hymap can be used in detecting contaminated water efficiently and precisely.

Keyword: hyperspectral, water quality, Hymap.