

Water resource monitoring exploiting Sentinel-2 and Sentinel-2 like time series; application in Yangtze river water bodies

J. BRIANT, M. STUDER', C. HUBER', C. LEI², Y. KUNPENG² & H.YESOU'



I - ICube-SERTIT, University of Strasbourg, France - jbriant@unistra.fr

2 - State Key Laboratory of Urban and Regional Ecology, Research Center for Eco-Environmental Science, CAS Beijing, China

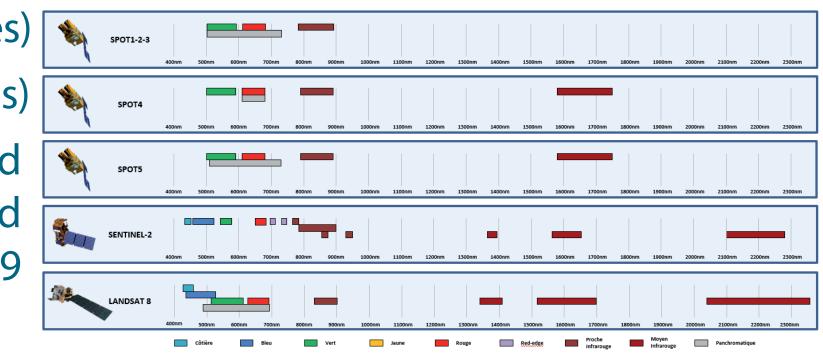
INTRODUCTION

Water resources and depending biodiversity stakes within Yangtze watershed are very important at national level but also international ones. These very rich ecosystems, being key wintering areas for many waterfowl of East Asia, are suffering from rapidly changing environments due to human activities. Works are on progress over Anhui Lakes in regards to water bodies recognition and the monitoring of their dynamic. The arrival of Sentinel-2 data could be of great help for the monitoring of such water bodies.

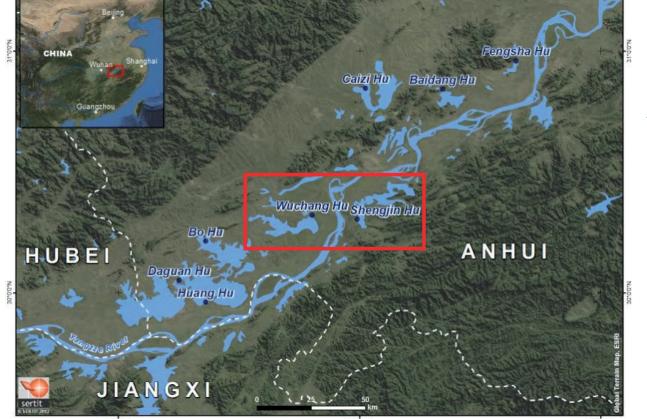
Wuchang and Shengjin Lakes are situated on both banks of the Yangtze river, in the Anhui Province. The aim is to use Sentinel-2, Landsat 8 and SPOT images to extract and follow the evolution of the lakes water surfaces. The relevance of the data should be assessed.

DATA

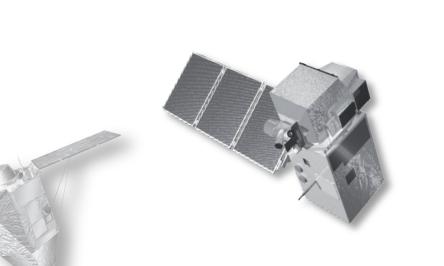
- Sentinel-2 since launch in 2015 (32 dates) Landsat 8 to densify S2 dataset (10 dates)
- SPOT 1-3-4-5 from the SPOT World Heritage Program covering the period 1987-2009 to give a temporal depth (19 dates)
- Pekel's water occurence product for training the classifier
- The final acquisition



Spectral range of exploited data



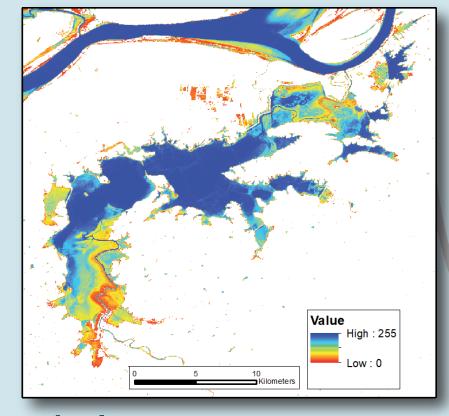
frequency is 1 image every 22 days between October 2015 and April 2018



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	Data used (Sentinel-2 and Landsat 8)																Date	SPOT													
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Exploited Sentinel-2, Landsat 8 and SPOT time series

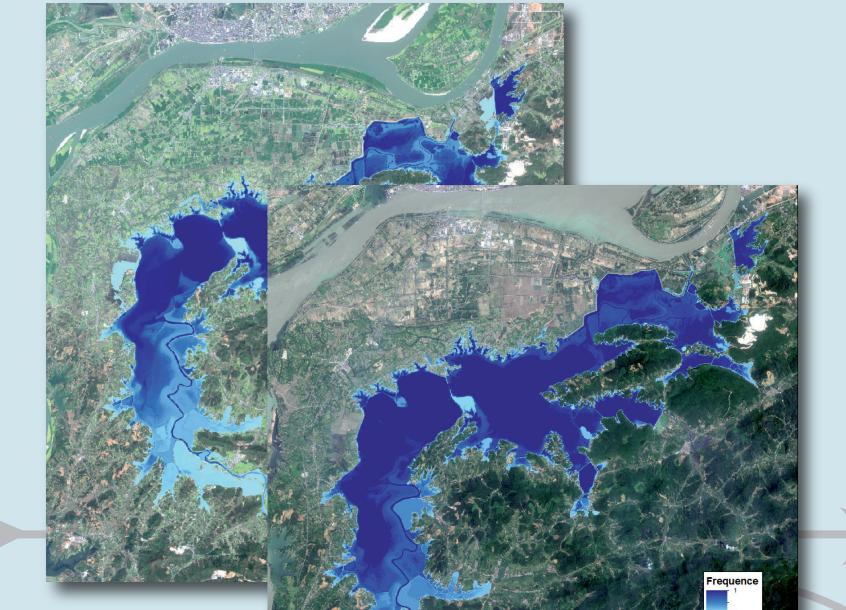
METHOD & RESULTS

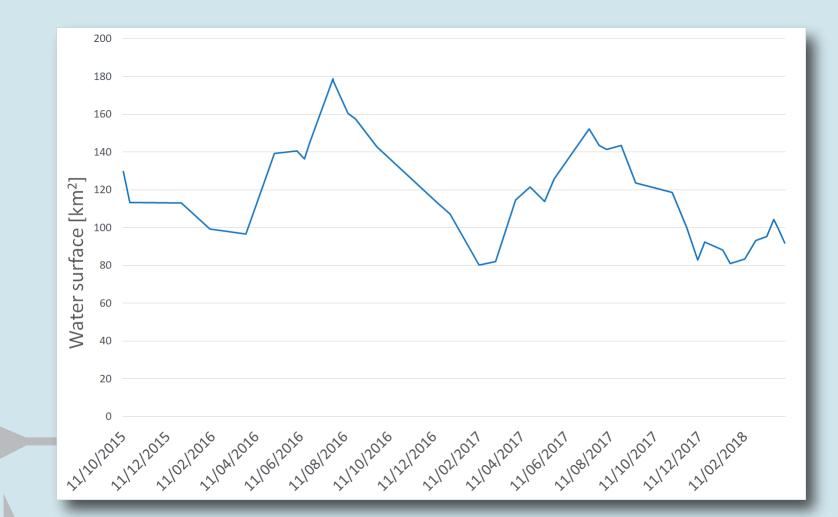


Pekel's water occurence product (Shengjin example)



behaviors in presence of water)





Sentinel-2, Landsat 8 and SPOT World Heritage data collection

DISCUSSION

• Both lakes show high surface variability

• Shengjin Lake's water surface area shows clear seasonal beahviors with an infilling during spring, a maximum reached in summer and a water draw of during fall, typical of moonson lakes

Binary classification using a trained Maximum Likelihood Classification (based on SWIR

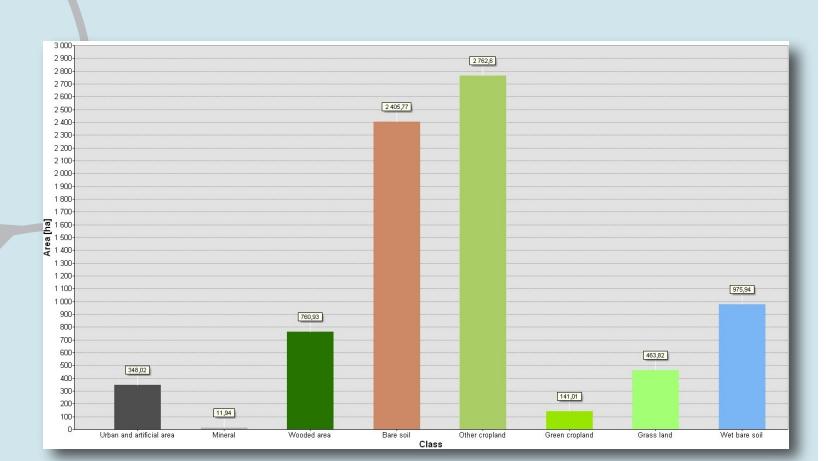


Total and yearly water occurence calculation



Landcover map derived from Pleiades HR imagery

Surface water temporal evolution



Flooded types of surface around Shengjin Lake since October 2015

CONCLUSION & PERSPECTIVES

- Sentinel-2 and Sentinel-2 like data are very relevant for water surface survey
- Limited by climatic condition but compensate with high temporal resolution
- Water under vegetation can't be extracted automatically with this method • Allow dense time series and to capture relatively quick events

- Wuchang Lake's water surface area is more chaotic, partially due to the strong presence of vegetation at the surface
- 2016 floods are visible on occurence maps and surface water graphs with an extra water surface of about 30%

MAJOR REFERENCES

- Q. Jia, L. Cao, H. Yésou, C. Huber, A. D. Fox, 2017. Combating aggressive macrophyte encroachment on a typical Yangtze River lake: lessons from a long-term remote sensing study of vegetation changes. Aquat Ecol. 2017, 51-1, p177-189.

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• The presence of SWIR is of great help for water extraction

• Water occurence results can be put in relation with other types of data (birds presence, landcover)

ACKNOWLEDGMENTS



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