

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

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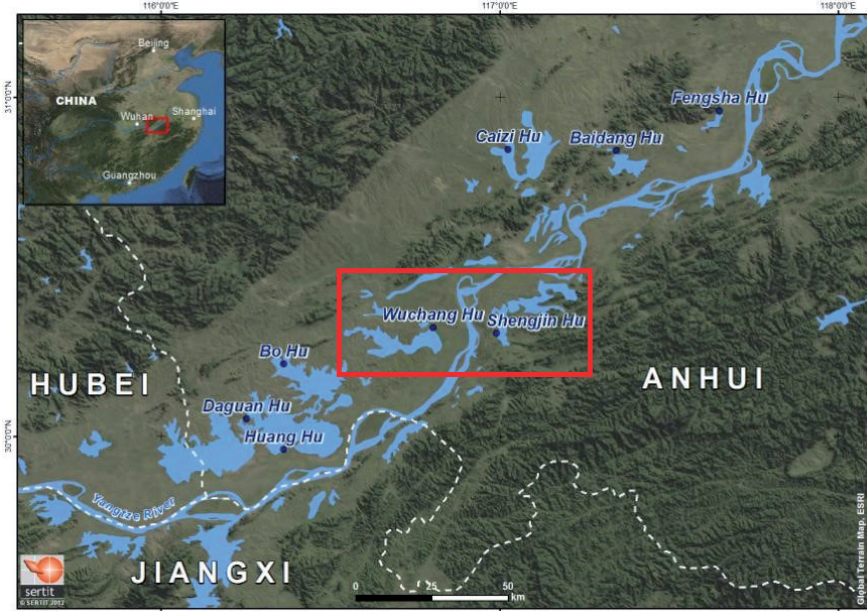
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## INTRODUCTION

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. Sentinel-2 data are very promising tools for the monitoring of such water bodies.

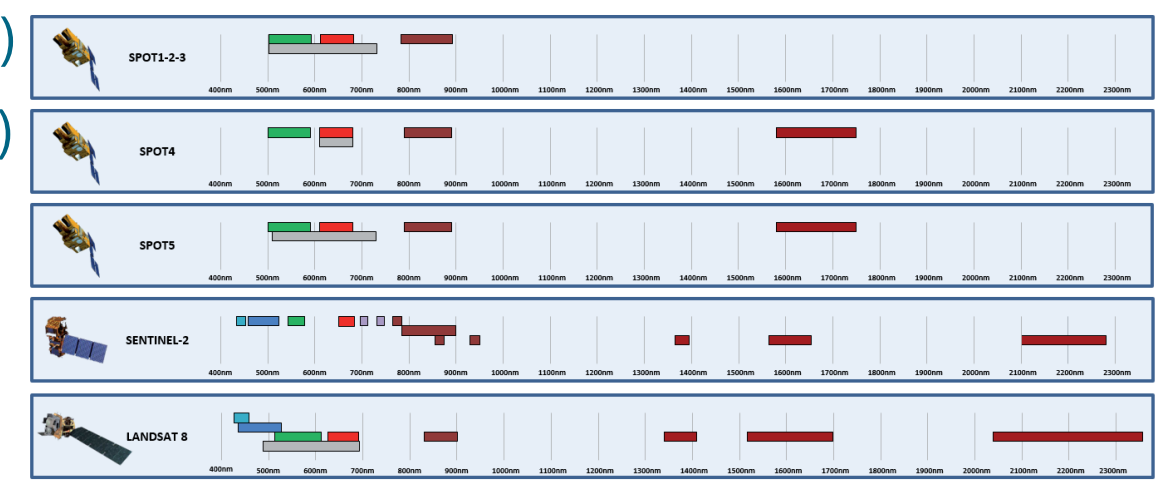
## OBJECTIVES



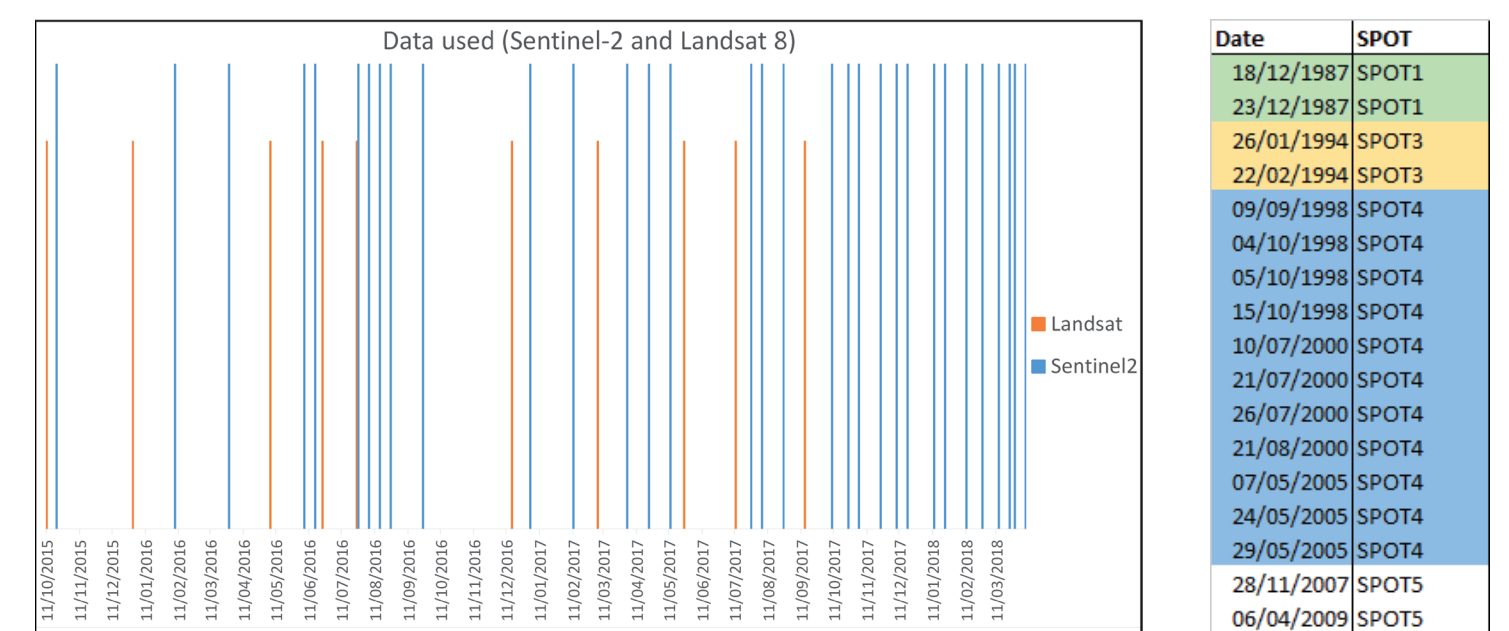
Wuchang and Shengjin Lakes are situated on both banks of the Yangtze river, in the Anhui Province. The aim is to use Sentinel-2, Landsat 8 and SPOT images to extract and follow the evolution of the lakes water surfaces. The relevance of the data should be assessed.

## 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 occurrence product for training the classifier
- The final acquisition frequency is 1 image every 22 days between October 2015 and April 2018

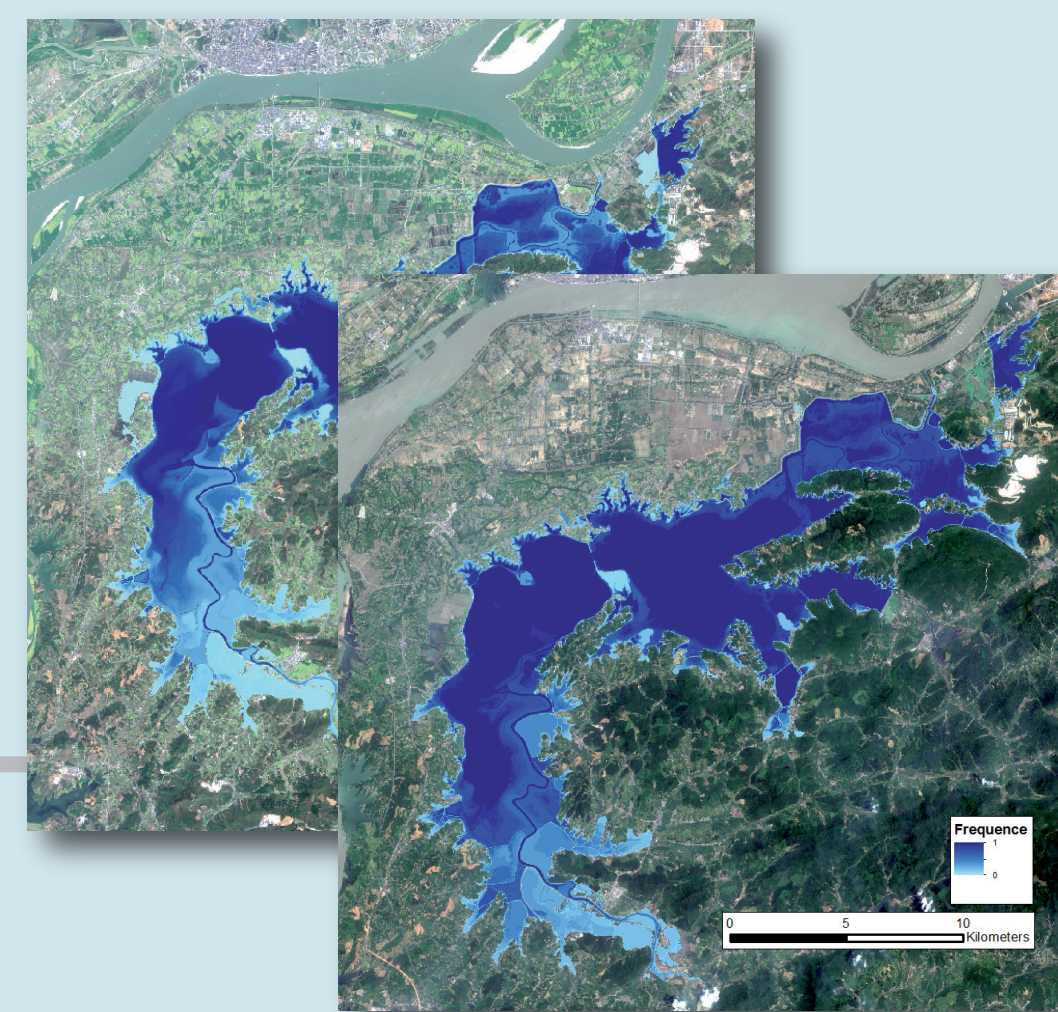
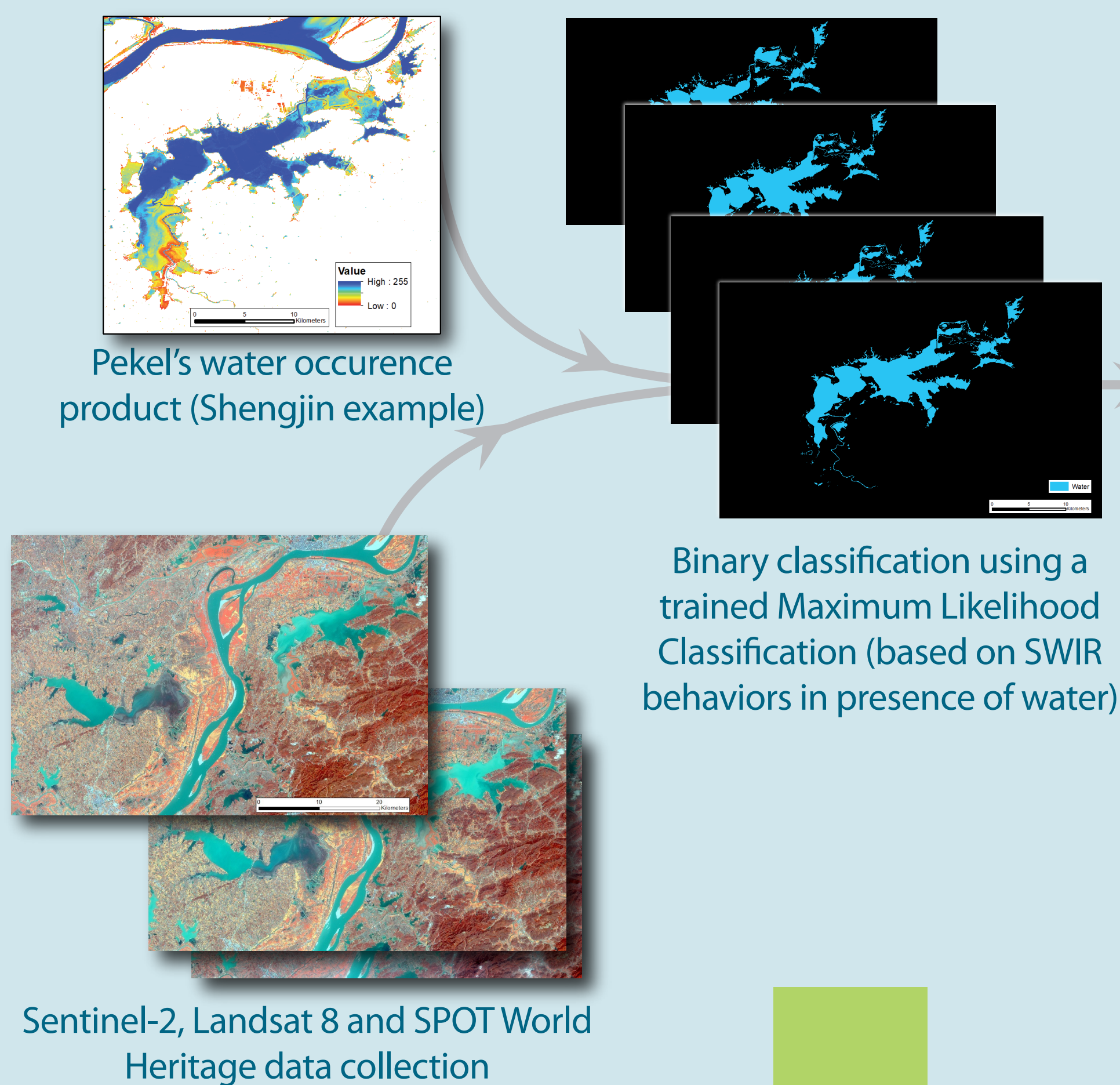


Spectral range of exploited data

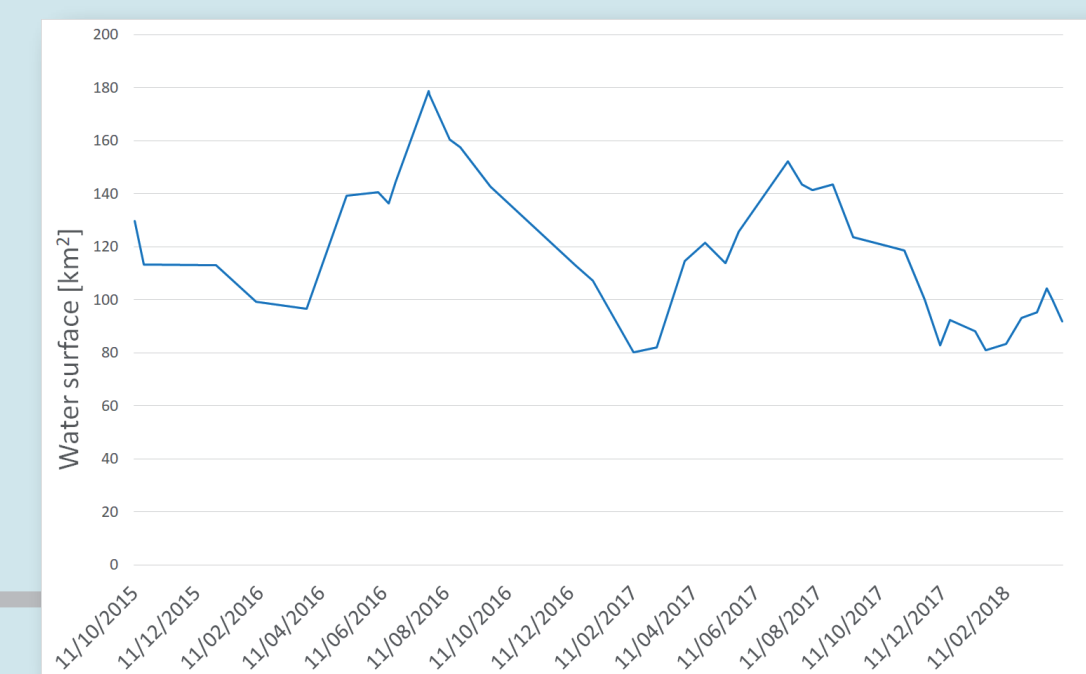


Exploited Sentinel-2, Landsat 8 and SPOT time series

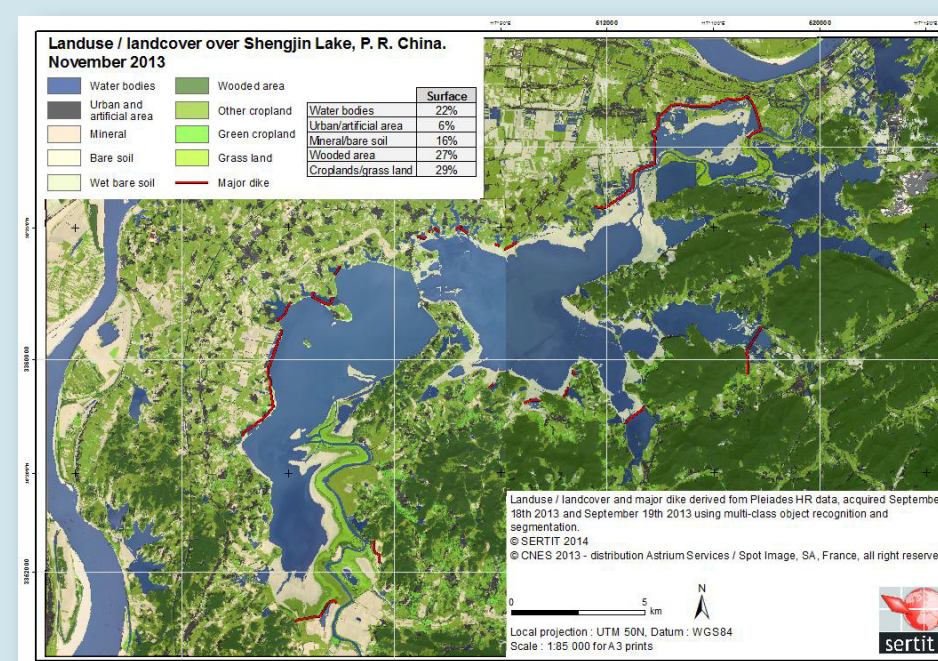
## METHOD & RESULTS



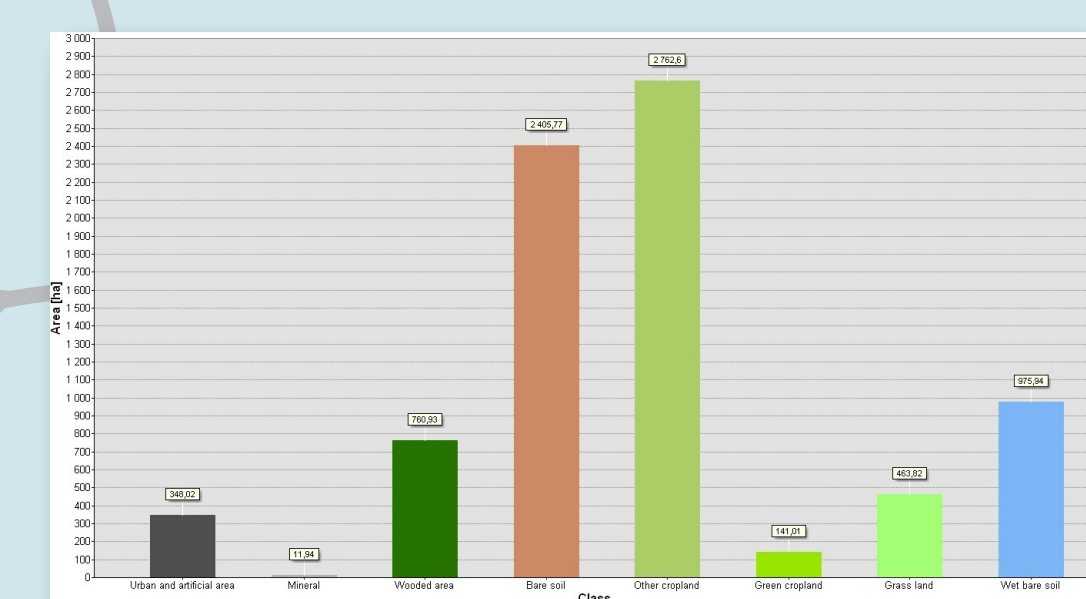
Total and yearly water occurrence calculation



Surface water temporal evolution



Landcover map derived from Pleiades HR imagery



Flooded types of surface around Shengjin Lake since October 2015

## DISCUSSION

- Both lakes show high surface variability
- Shengjin Lake's water surface area shows clear seasonal behaviors with an infilling during spring, a maximum reached in summer and a water draw during fall, typical of monsoon lakes
- 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 occurrence maps and surface water graphs with an extra water surface of about 30%

## MAJOR REFERENCES

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- Y. Cheng, L. Cao, M. Barter, W. Xu, Y. Zhang, and M. Zhao. Wintering waterbird survey at the Anhui Shengjin lake national nature reserve, China 2008/9. University of Science and Technology of China Press, Hefei, 2009.
- J.F. Pekel, A. Cottam, N. Gorelick, and A. S. Belward. High-resolution mapping of global surface water and its long-term changes. *Nature*, 540 (7633): 418, 2016.

## 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
- The presence of SWIR is of great help for water extraction
- Water occurrence results may be put in relation with other types of data (birds presence, landcover)

## ACKNOWLEDGMENTS

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