



# 水文遙測實驗室

Hydrology Remote Sensing Lab.



## Environmental Remote sensing and GIS for land surfaces

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• ResearchGate: [https://www.researchgate.net/profile/Yuei-An\\_Liou](https://www.researchgate.net/profile/Yuei-An_Liou)

• Wiki/維基百科: <https://zh.wikipedia.org/wiki/劉說安> [https://en.wikipedia.org/wiki/Yuei-An\\_Liou](https://en.wikipedia.org/wiki/Yuei-An_Liou)

### Record for Continental United States

Professor Ricky Rood shares his expertise with the media



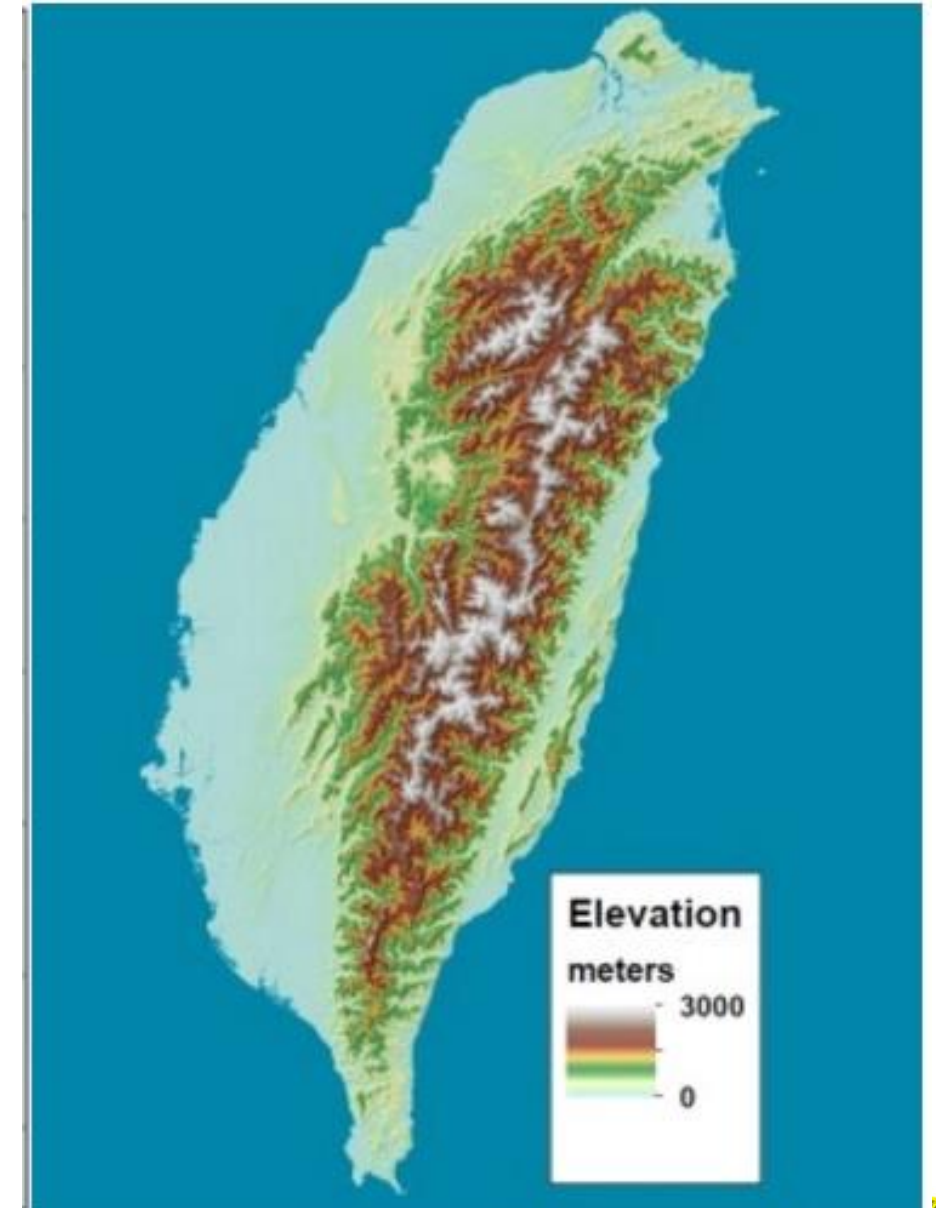
<p><b>Upcoming Events</b></p> <p>February 19th 3:30 pm - 4:30 pm Weekly Seminar</p> <p>February 19th 5:30 pm - 6:30 pm AOSS Open House</p> <p>February 21st 3:30 pm - 4:30 pm Weekly Seminar</p> <p>February 26th 3:30 pm - 4:30 pm Weekly Seminar</p> <p><a href="#">More Events</a></p>	<p><b>In the News</b></p> <p><b>AOSS SPOTLIGHT</b> <b>Dr. Yuei-An Liou: Alumnus Spotlight</b></p>  <p>Alumnus Dr. Yuei-An Liou is a professor at the National Central University in Taiwan and is President of the Taiwan Group on Earth Observations.</p> <p>Liou is recognized internationally for his work in leading remote sensing research.</p> <p>Liou says his favorite memory from AOSS is the kindness of the community.</p> <p><a href="#">Full Spotlight</a></p>	<p><b>AOSS on the Web</b></p> <p><a href="#">f</a> <a href="#">t</a> <a href="#">in</a> <a href="#">p</a> <a href="#">v</a> <a href="#">y</a></p> <p><b>Daily Planet</b> Get the latest on AOSS and SPRL activities</p> <p><b>Jobs for Grads</b> Find out who's hiring in the industry</p>
<p><b>Popular Pages</b></p> <ul style="list-style-type: none"> <li>Graduate Studies</li> <li>Research Experience for Undergraduates (REU) at the U-M Department of Atmospheric, Oceanic and Space Sciences</li> <li>Graduate MEng Program - Space Engineering</li> <li>Undergraduate Studies</li> <li>Atmospheric Sciences</li> </ul>	<p><b>2013 Leaders and Honors Award Recipients</b></p> <p>Congratulations to the following students who earned Leaders and Honors Awards from the College:</p> <p>Alex Bryan, Distinguished Leadership Award Guangxing Lin, Towner Prize for Distinguished Academic... (more)</p> <p><b>Alumnus Kevin Reed receives honorable mention for dissertation</b></p>	<p><b>AOSS Blogroll</b></p> <p><b>Climate Science</b></p> <ul style="list-style-type: none"> <li>Rick Rood Climate Change</li> <li>Ricky Rood Climate Policy</li> </ul> <p><b>Space Science</b></p> <ul style="list-style-type: none"> <li>Mark Moldwin "From the Field" Science Blog (Encyclopedia Britannica)</li> </ul> <p><b>General Interest</b></p> <ul style="list-style-type: none"> <li>Aaron Ridley Personal Blog</li> </ul>

# The Past - Preparation for now and the future

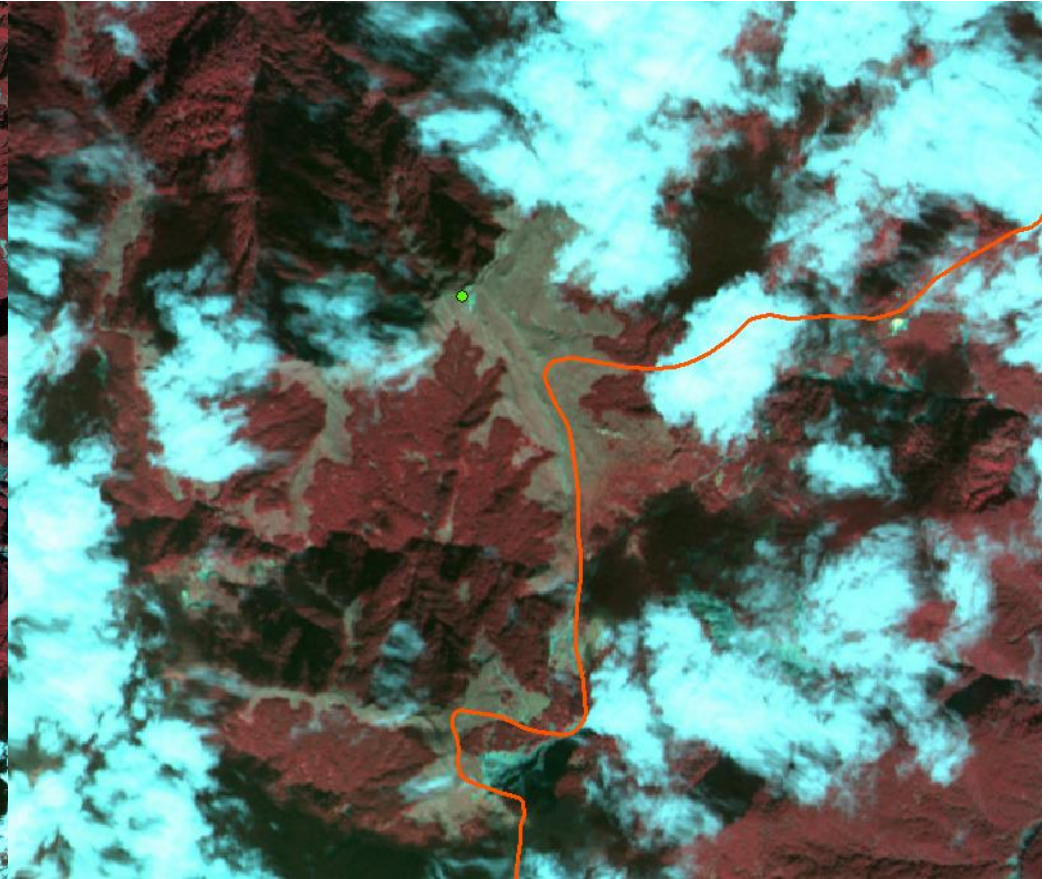
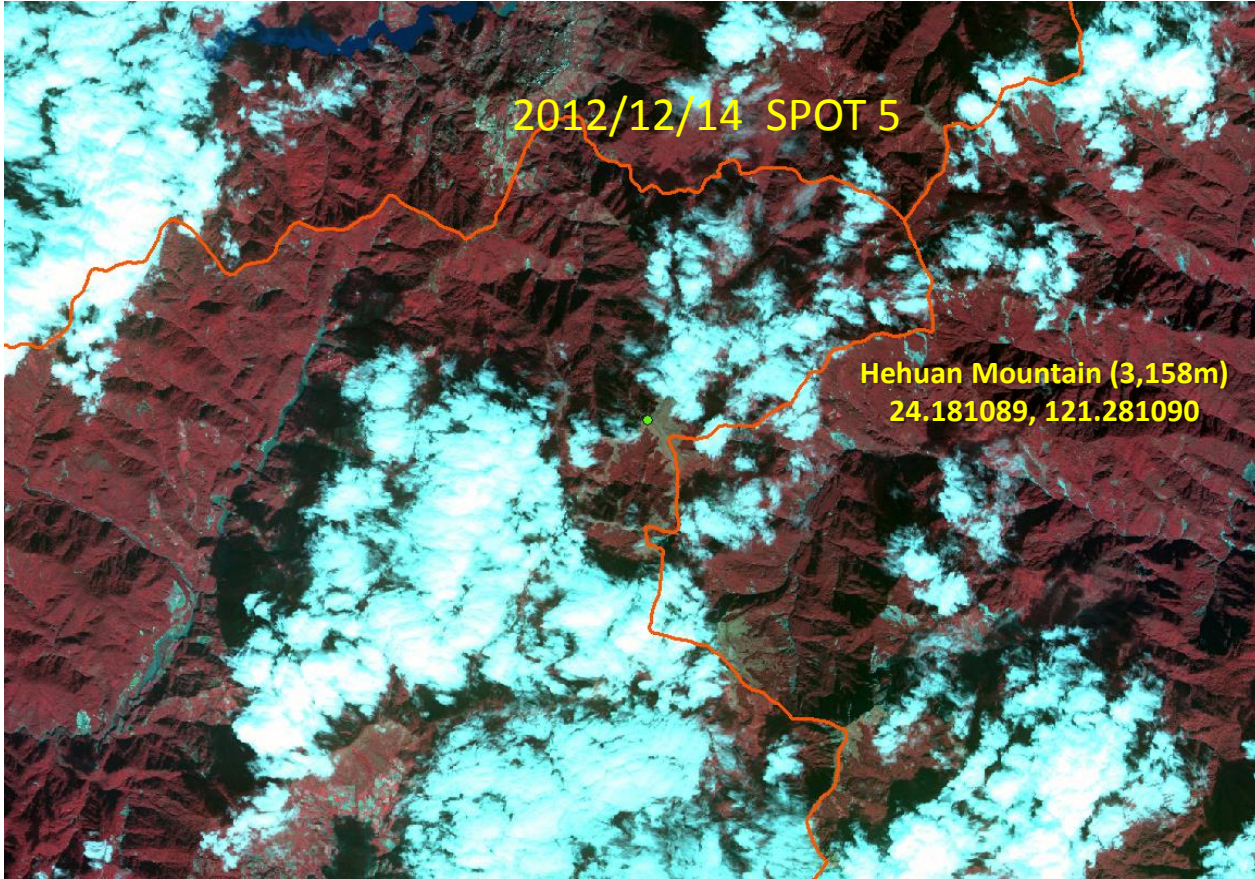
# Taiwan's topography and snow events

# Taiwan's topography and snow events (1/4)

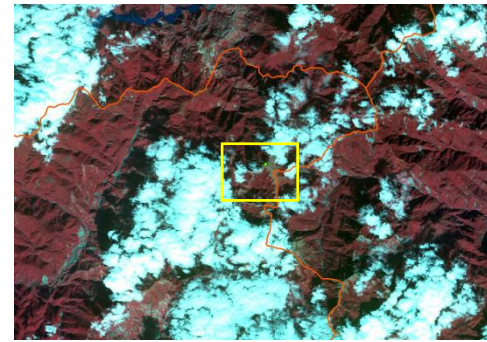
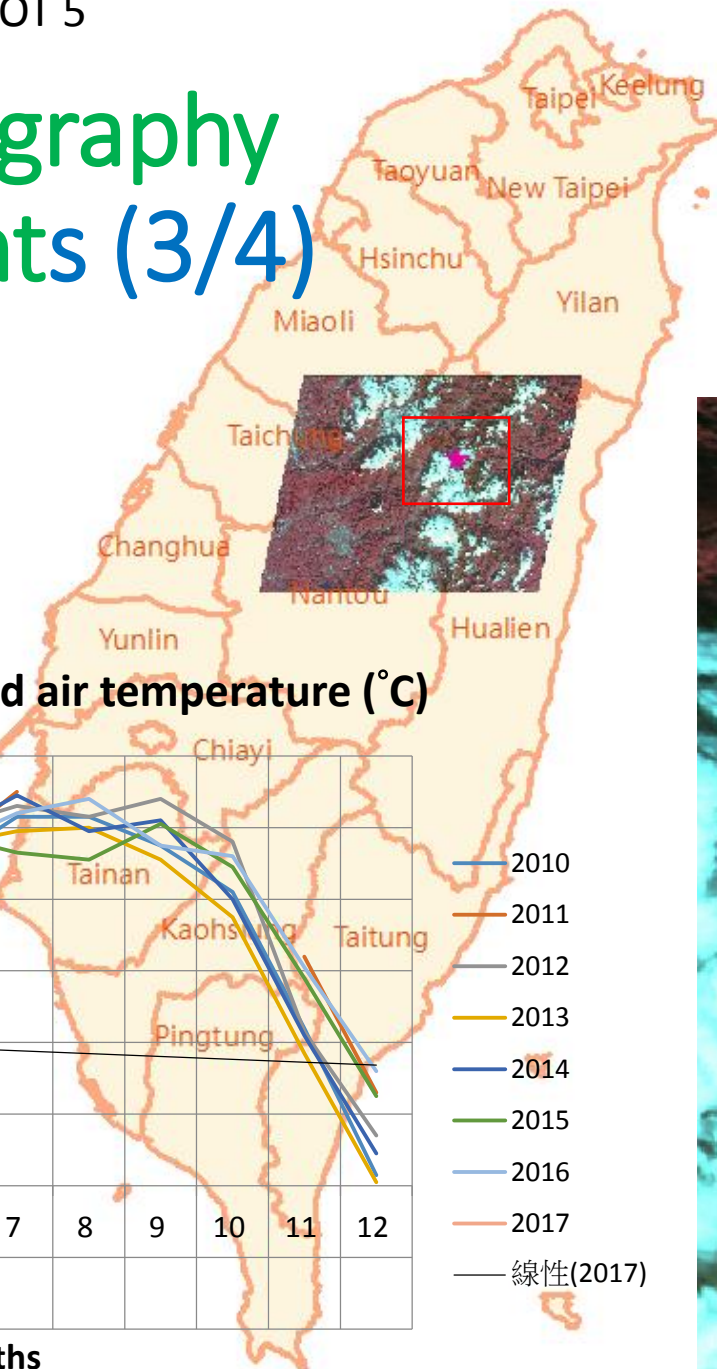
- Taiwan is home to eastern Asia's highest peak, Yushan (also Mount Jade, Jade Mountain, Yushan or Mount Morrison) at 3,952 meters/12,966 ft above sea level. Yushan normally receives plenty of snowfall each winter – although it is all melted by mid-Spring. It sounds possible to ski in Taiwan, if you hike up with your gear, although it is hard to find the reports of anyone having done so. **There are no Taiwan ski resorts as such.**
- Winter snow stays as late as April or May on the slopes of Taiwan's highest peak, Mount Jade, which is also known as the "snowy mountain of the tropics".



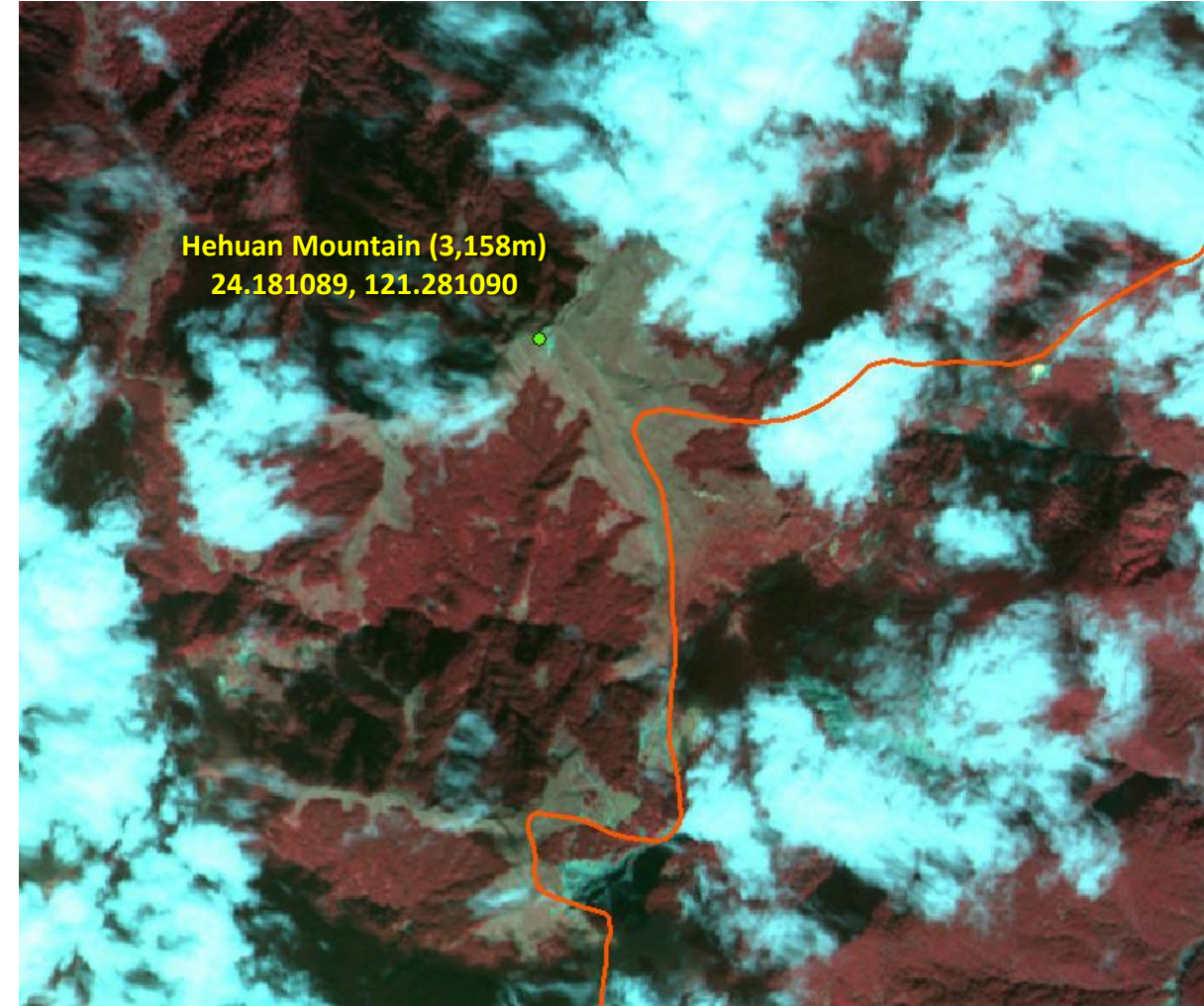
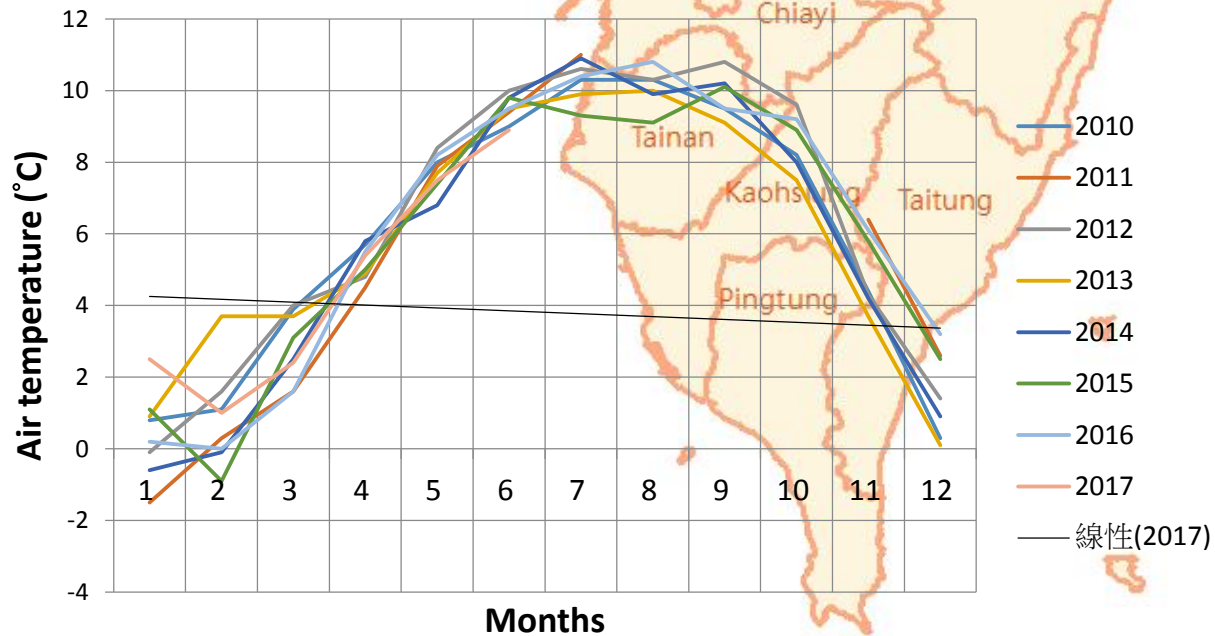
# Taiwan's topography and snow events (2/4)

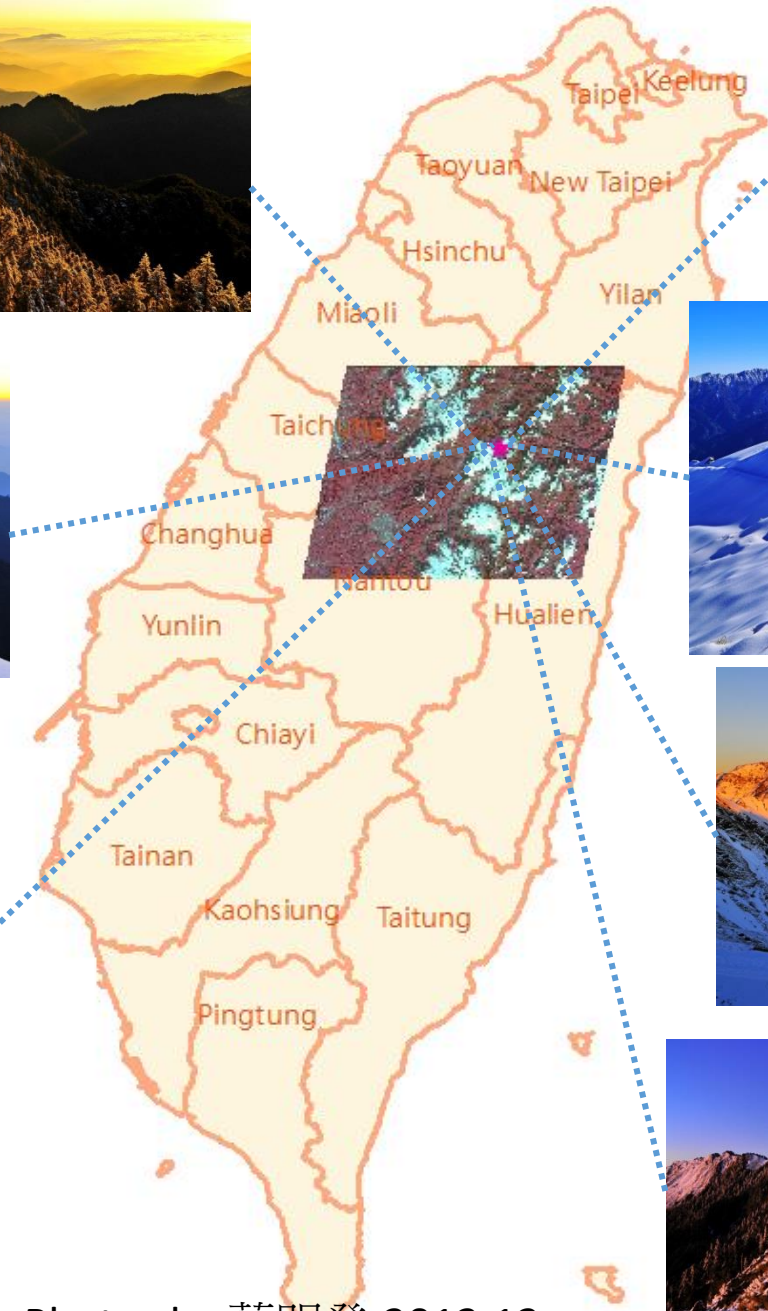


# Taiwan's topography and snow events (3/4)



Monthly averaged air temperature (°C)





Photos by 蔡明發 2012.12

# Remote sensing and GIS for land surfaces and Environmental

*Recent 5-year publications*

→ Hydrological process remote sensing (1/4)

→ Eco-environment & urban green spaces (2/4)

→ Disaster & Damage assessment (3/4)

→ GNSS radio occultation remote Sensing (4/4)



# (1/4) Hydrological process remote sensing

**1.1 Evapotranspiration estimation through remote sensing and various surface energy balance algorithms – a review**

**1.2 Energy budget on various land use areas using reanalysis data in Florida**

**1.3 Estimation of Root Zone Soil Moisture using Apparent Thermal Inertia with MODIS Imagery over the Tropical Catchment of Northern Thailand**

**1.4 Impacts of Pond Change on the Regional Sustainability of Water Resources in Taoyuan, Taiwan**

**1.5 Vanishing ponds and regional water resources in Taoyuan, Taiwan**

**1.6 Evaluation of surface heat fluxes in Chiayi plain of Taiwan by remotely sensed data**

**1.7 Terrain correction for increased estimation accuracy of evapotranspiration in a mountainous watershed**

**1.8 On the Relationship between LULC Changes and Regional Thermal Environment in Taoyuan, Taiwan**

# (2/4) Eco-environment & Urban Green Spaces

2.1 GIS framework for urban green space information system toward citizen's science

2.2 Zoning eco-environmental vulnerability for environmental management and protection

2.3 Assessing spatiotemporal eco-environmental vulnerability

## (3/4) Disaster & Damage assessment

3.1 Use of high-resolution Formosat-2 satellite images for post-earthquake disaster assessment: A study following 12 May 2008 Wenchuan earthquake.

3.2 Analysis of interactions among two tropical depressions and typhoons Tembin and Bolaven (2012) in Pacific Ocean by using satellite cloud images.

3.3 Changes in glaciers and glacial lakes and the identification of dangerous glacial lakes in the Pumqu river basin, Xizang (Tibet).

3.4 Assessment of disaster losses in rice field and yield after tsunami induced by the 2011 Great East Japan earthquake

3.5 Object-based flood mapping and affected rice field estimation with Landsat 8 OLI and MODIS data, central Taiwan

# (4/4) GNSS radio occultation remote Sensing

**4.1 World Rank Top 5, most scientific products in radio occultation research by International Radio Occultation Working Group (IROWG)**

# REFERENCES – 1/5

- 2017 (3 papers, 3 SCI/3 correspondence)(IF =12.618, CNG=1, CNS=1)
- Yuei-An Liou\*, Anh Kim Nguyen\*, and Ming-Hsu Li, 2017. Assessing spatiotemporal eco-environmental vulnerability by Landsat data. *Ecological Indicators* [Miss Nguyen is a PhD student of Prof. Liou] **(SCI, IF=3.898)**
- Yung-Sheng Lee, Yuei-An Liou\*, Ji-Chyun Liu, Ching-Tsan Chiang, and Kuan-Dih Yeh, 2017: Formation of Winter Supertyphoons Haiyan (2013) and Hagupit (2014) Through Interactions with Cold Fronts as Observed by Multifunctional Transport Satellite, *IEEE Transactions on Geoscience and Remote Sensing*, doi:10.1109/TGRS.2017.2680418. **(SCI, IF=4.942)**
- Wei Li, Yun-bin Yuan, Yan-Ju Chai, Yuei-An Liou, Ji-kun Ou, Shi-ming Zhong. Characteristics of the global thermal tropopause derived from multiple radio occultation measurements. *Atmospheric Research*, [Volume 185](#), 1 March 2017, Pages 142–157, <http://doi.org/10.1016/j.atmosres.2016.09.013>. **(SCI, IF=3.778)**

2016 (6 papers, 6 SCI/5 correspondence)(IF = 17.139, CNG=14, CNS=8)

Munkhzul Dorjsuren, Y.-A. Liou\*, Chi-Han Cheng, 2016: Time series MODIS and in-situ data analysis for Mongolia drought, *Remote Sensing*. 2016; 8(6):509; doi:10.3390/rs8060509. (<http://www.mdpi.com/2072-4292/8/6/509>) [Miss Dorjsuren is a PhD student of Prof. Liou] **(SCI, IF=3.18)**

Nguyen, K. A., Y.-A. Liou\*, M.-H. Li, and A. T. Tran, 2016: Zoning eco-environmental vulnerability for environmental management and protection. *Ecological Indicators*, 69(2016), 100-117, <http://dx.doi.org/10.1016/j.ecolind.2016.03.026>. [Miss Nguyen is a PhD student of Prof. Liou] **(SCI, IF=3.89)**

Kuleshov, Y., S. Choy, E. F. Fu, F. Chane-Ming, Y.-A. Liou, and A. G. Pavelyev, 2016: Analysis of meteorological variables in the Australasian region using ground- and space-based GPS Techniques. *Atmospheric Research*, 147-148, 111–120, doi: <http://dx.doi.org/10.1016/j.atmosres.2016.02.021>. **(SCI, IF=2.844)**  
(<http://www.sciencedirect.com/science/article/pii/S0169809516300382>)

Liou, Y.-A.\*, J.-C. Liu, Meng-Xi Wu, Chi-Han Cheng, Ching-Ping Kuei, and Rong-Moo Hong, 2016: Generalized empirical formulas of threshold distance to characterize cyclone-cyclone interactions. *IEEE Transactions on Geoscience and Remote Sensing*, 54(6), 3502-3512, doi:[10.1109/TGRS.2016.2519538](https://doi.org/10.1109/TGRS.2016.2519538). **(SCI, IF=2.933)**  
(<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7401024>)

Wang, Z. Y., T. Che, and Y.-A. Liou\*, 2016: Global Sensitivity Analysis of the L-MEB Model for Retrieving Soil Moisture. *IEEE Transactions on Geoscience and Remote Sensing*. PP, 1–14, doi:10.1109/TGRS.2015.2509176. **(SCI, IF=3.514)**  
(<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7389400>)

2015 (8 papers, 8 SCI/7 correspondence)(IF=20.712, CNG=40, CNS=17 )

Cheng, C.-H., F. Nnadi, Y.-A. Liou\*, 2015: A Regional Land Use Drought Index for Florida, *Remote Sensing*, 7(12), 17149–17167, doi:10.3390/rs71215879. **(SCI, IF=3.18)** ( <http://www.mdpi.com/2072-4292/7/12/15879/pdf> )

Hsu, Wei-Chen, Hung-Cheng Chang, Kuan-Tsung Chang, En-Kai Lin, Jin-King Liu, and Y.-A. Liou\*, 2015: Observing Land Subsidence and Revealing the Factors That Influence It Using a Multi-Sensor Approach in Yunlin County, Taiwan, *Remote Sensing*, 7, 8202-8223, doi: 10.3390/rs70608202. **(SCI, IF=3.18)** (<http://www.mdpi.com/2072-4292/7/6/8202/htm>)

Liou, Y.-A.\*, C. T. Lee, C. R. Ho, and M. H. Li, 2015: Preface to the special issue on “Earth Observations and Societal Impacts”. *Terrestrial, Atmospheric and Oceanic Sciences*, 26, I-II, doi: 10.3319/TAO.2014.10.07.01(EOSI). **(SCI, IF=0.703)** ([https://www.researchgate.net/profile/Yuei-An\\_Liou/publication/277022187\\_Preface\\_to\\_the\\_Special\\_Issue\\_on\\_\\_Earth\\_Observations\\_and\\_Societal\\_Impacts\\_/links/555ff91608ae9963a118b78b.pdf](https://www.researchgate.net/profile/Yuei-An_Liou/publication/277022187_Preface_to_the_Special_Issue_on__Earth_Observations_and_Societal_Impacts_/links/555ff91608ae9963a118b78b.pdf))

Liou, Y.-A.\*, H. L. Liu, T. S. Wang, and C. H. Chou, 2015: Vanishing ponds and regional water resources in Taoyuan, Taiwan. *Terrestrial, Atmospheric and Oceanic Sciences*, 26(2), 161-168, doi: 10.3319/TAO.2014.12.02.01(EOSI). **(SCI, IF=0.703)** (<http://tao.cgu.org.tw/pdf/v262-IIp161.pdf>)

Dao, Phuong D. and Y.-A. Liou\*, 2015: Object-based Flood Mapping and Affected Rice Field Estimation with Landsat 8 OLI and MODIS Data. *Remote Sensing*, 7(5), 5077-5097, doi: 10.3390/rs70505077. [Mr. Dao is a MS student of Prof. Liou.] **(SCI, IF=3.18)** (<http://www.mdpi.com/2072-4292/7/5/5077/pdf> )

Pavelyev, A.G., **Y.-A. Liou\***, S. S. Matyugov, A.A. Pavelyev, V. N. Gubenko, K. Zhang, and Y. Kuleshov, 2015: Application of the locality principle to radio occultation studies of the Earth's atmosphere and ionosphere, *Atmospheric Measurement Techniques*, 8, 2885–2899, doi: 10.5194/amtd-8-2885-2015. **(SCI, IF= 2.929)** (<http://www.atmos-meas-tech.net/8/2885/2015/amt-8-2885-2015.pdf>)

Li, W., Y.-B. Yuan, J.-K. Ou, Y.-J. Chai, Z.-S. Li, **Y.-A. Liou**, and N.-B. Wang, 2015: New versions of the BDS/GNSS zenith tropospheric delay model IGGtrop, *Journal of Geodesy*, 89, 73–80, 2015, doi: 10.1007/s00190-014-0761-5 **(SCI, IF= 2.699)** (<http://link.springer.com/article/10.1007/s00190-014-0761-5>)

Liu, Ji-Chyun, **Y.-A. Liou\***, Meng-Xi Wu, Yueh-Jyun Lee, Chi-Han Cheng, and Ching-Ping Kuei, 2015: Analysis of interactions among two tropical depressions and typhoons Tembin and Bolaven (2012) in Pacific Ocean by using satellite cloud images. *IEEE Transactions on Geoscience and Remote Sensing*, 53(3), 1394-1402, doi: 10.1109/TGRS.2014.2339220. **(SCI, IF=3.514)**

2014 (8 papers, 8 SCI/6 correspondence)[3](IF=16.799, CNG=80, CNS= 54)

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Kar, S.K. and Y.-A. Liou<sup>\*</sup>, 2014: Enhancement of cloud-to-ground Lightning activity over Taipei, Taiwan in relation to urbanization. *Atmospheric Research*, 147-148, 111–120, doi: 10.1016/j.atmosres.2014.05.017 **(SCI, IF=2.844)** (<http://dx.doi.org/10.1016/j.atmosres.2014.05.017>)

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Che, Tao, Lin Xiao, and Y.-A. Liou<sup>\*</sup>, 2014: Changes in glaciers and glacial lakes and the identification of dangerous glacial lakes in the Pumqu river basin, Xizang (Tibet), *Advances in Meteorology*, 2014, Article ID 903709, 8 pages, doi: 10.1155/2014/903709 **(SCI, IF=0.946)** (<http://www.hindawi.com/journals/amete/2014/903709/>)

Chane Ming, F., C. Ibrahim, C. Barthe, S. Jolivet, P. Keckhut, Y.-A. Liou, and Y. Kuleshov, 2014: Observation and a numerical study of gravity waves during tropical cyclone Ivan (2008), *Atmospheric Chemistry and Physics*, 14, 641-658, doi:10.5194/acp-14-641-2014. **(SCI, IF=5.053)** (<http://www.atmos-chem-phys.net/14/641/2014/acp-14-641-2014.pdf>)

# Additional information for future conferences

1. International Conference on Earth Observation & Natural Hazards (ICEO&NH 2017)– Hanoi, Vietnam, Nov. 20-26, 2017 (<http://iceo-nh2017.com/>)
  
2. ICEO&SI – Hsinchu, Taiwan, July 1- 3, 2018 (<http://2018.iceo-si.org.tw/>) (possible with partial travel supports upon request and approval of potential sponsors)
  - 2.1 Invite some individuals
  - 2.2 Special session about SNOW research

# Thanks for your attention !



Photo by 蔡明發

# Taiwan's topography and snow event



Photo by 蔡明發