

After 3.11 2011

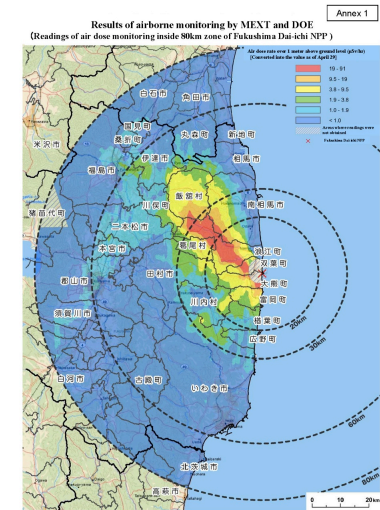
A Study on Micro-Scale Airborne Radiation Monitoring by Unmanned Aerial Vehicle for Rural Area Reform Contaminated by Radiation

Tomoyuki FURUTANI, Kei Uehara, Kazunori TANJI, Masaki USAMI and Toshihiko Asano

Scanning the Earth Project @Keio University



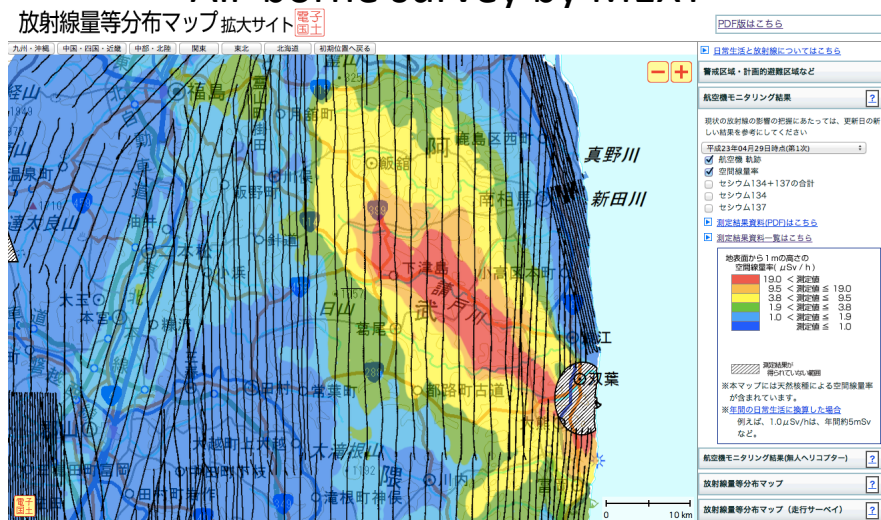
2013/11/21



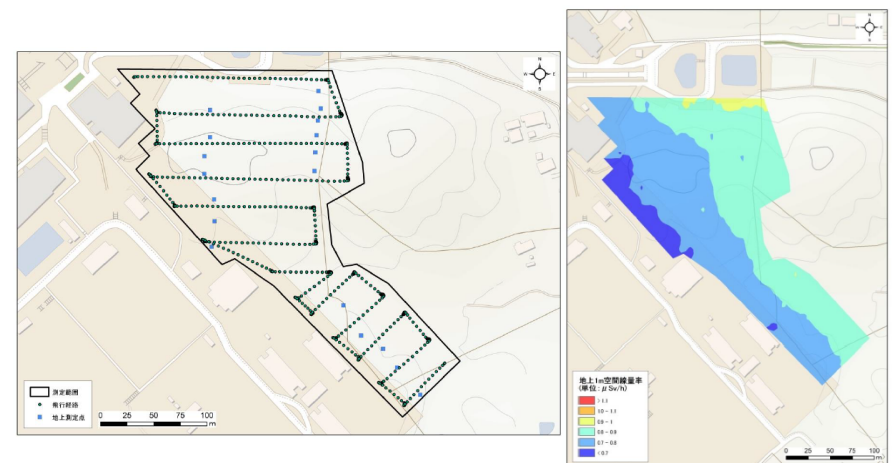
Upper left) 14th March 2011, © Digital Globe, Lower left) Reuters
Right) http://www.mext.go.jp/component/english/_icsFiles/afilefile/2011/05/10/1304797_0506.pdf

Backgrounds

Air-borne survey by MEXT



Background



JAEA (2013)

Backgrounds

3D visualization of DSM (digital surface model)

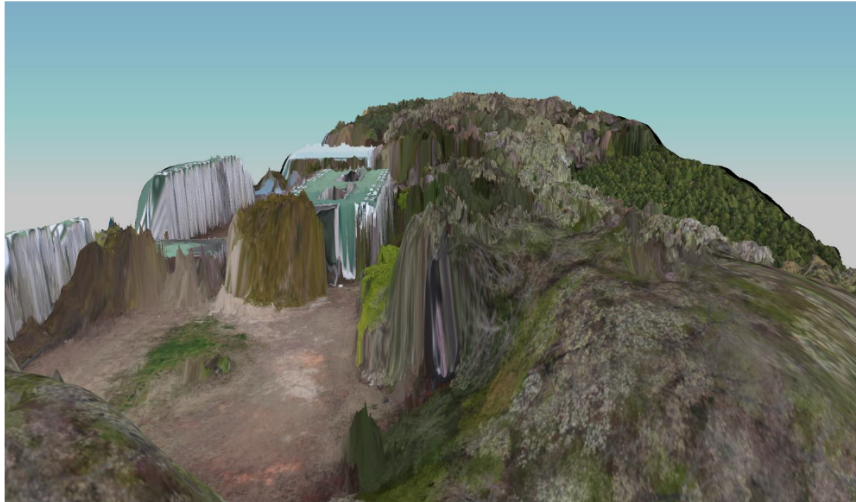
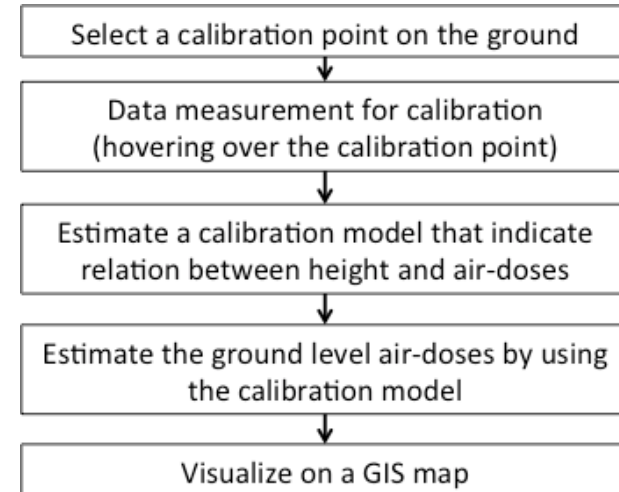


図3 3D画像 (厩舎から福大生協方向を見た図)

JAEA (2013)

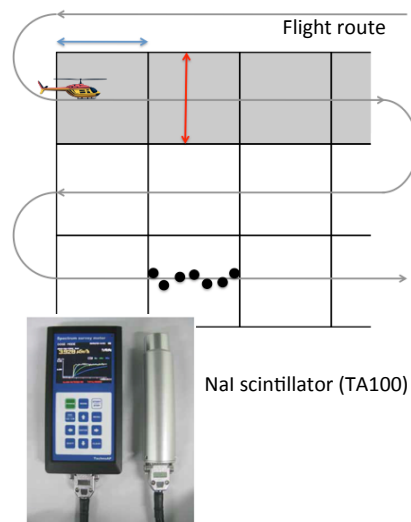
Methodologies



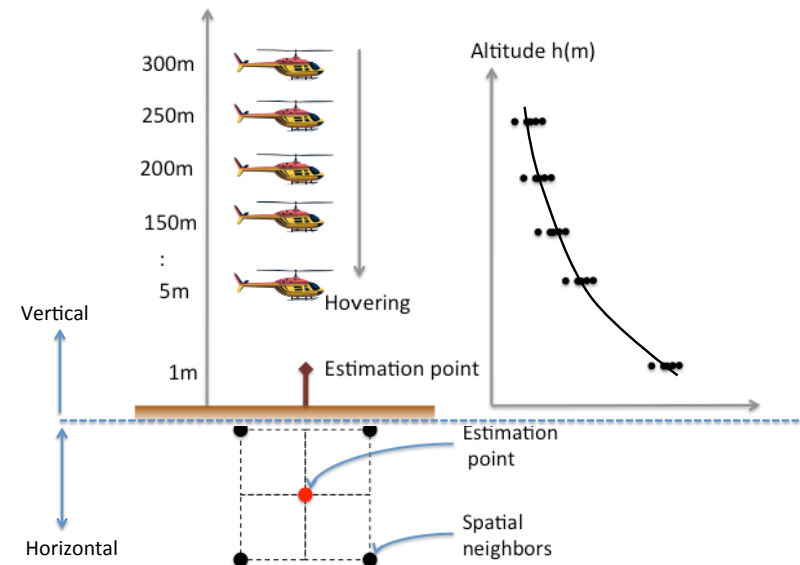
Air-borne Survey by UAV



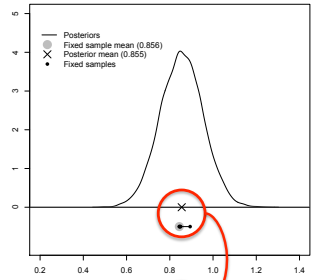
Robin PARS
Size: 1.84m x 0.3m x 1.03m
Payload: 5kg
Flight time: 1 hour
Flight distance: 30-40km
Wind resistance: 10km/h



Acquiring Calibration Data

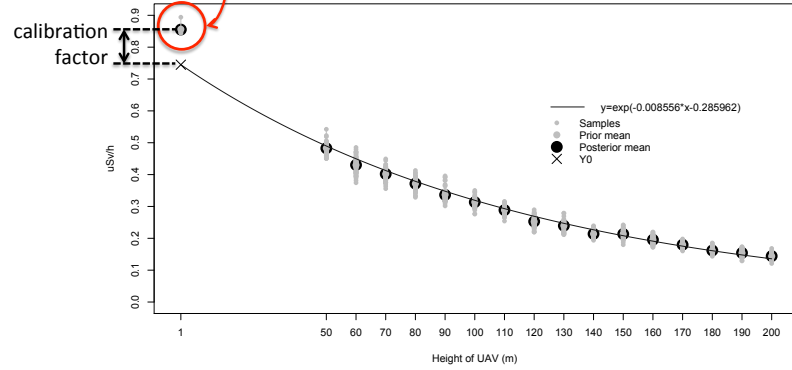


Results of calibration model estimation

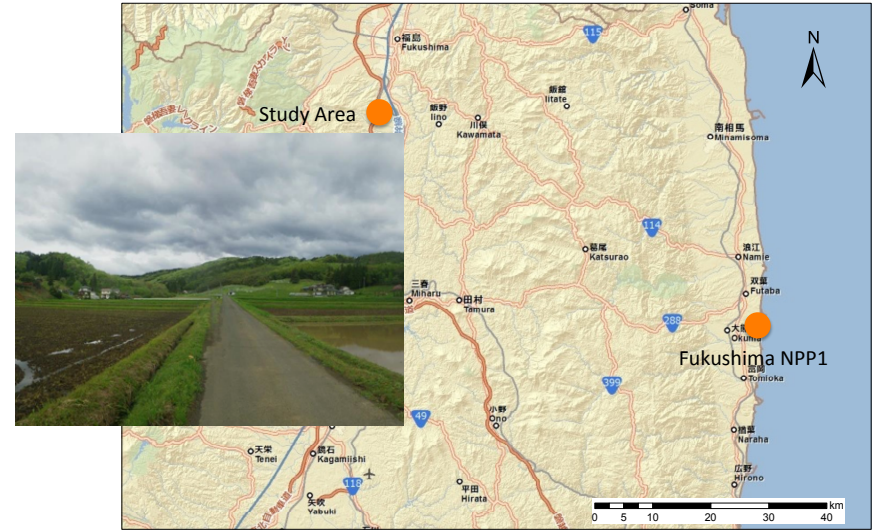


<- Posterior distribution of radiation

Calibration model estimation result



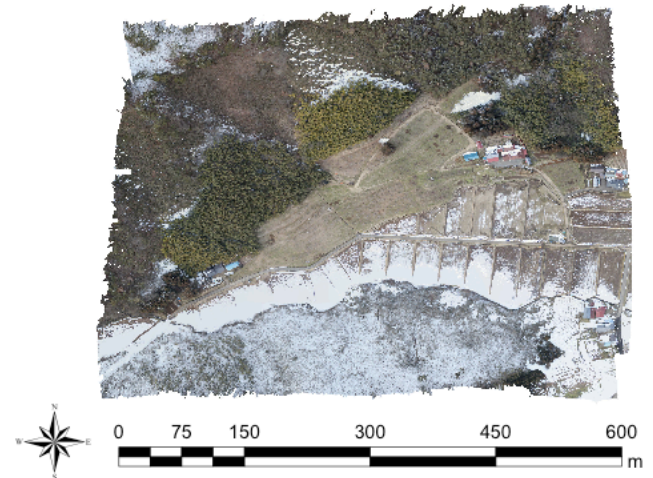
Study Area



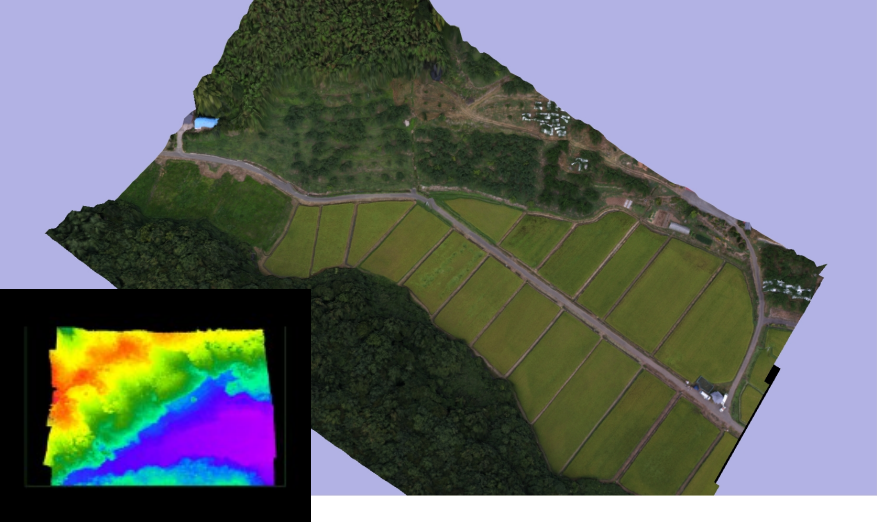
UAV Air-borne survey



Results: True ortho mosaic



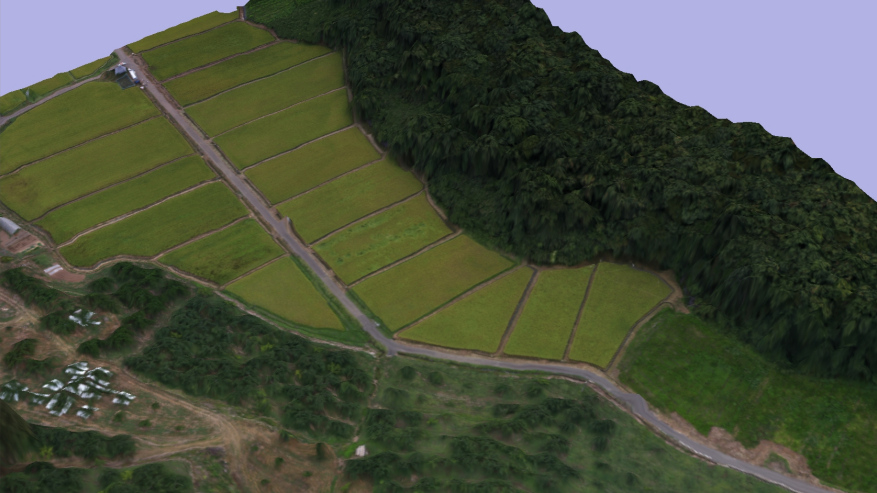
Results: 3D Visualization of DSM



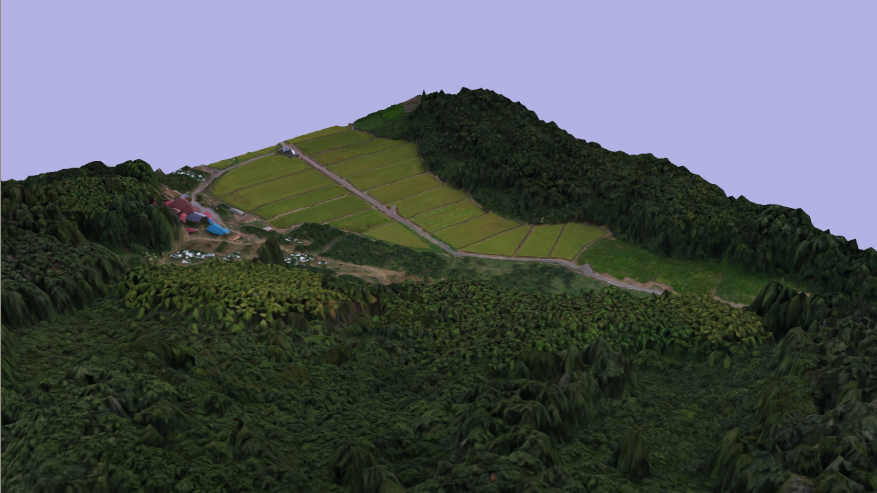
Results: 3D Visualization of DSM



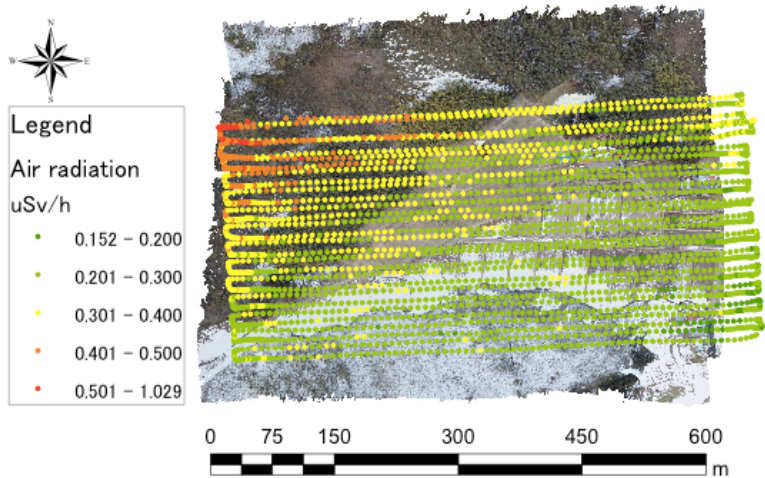
Results: 3D Visualization of DSM



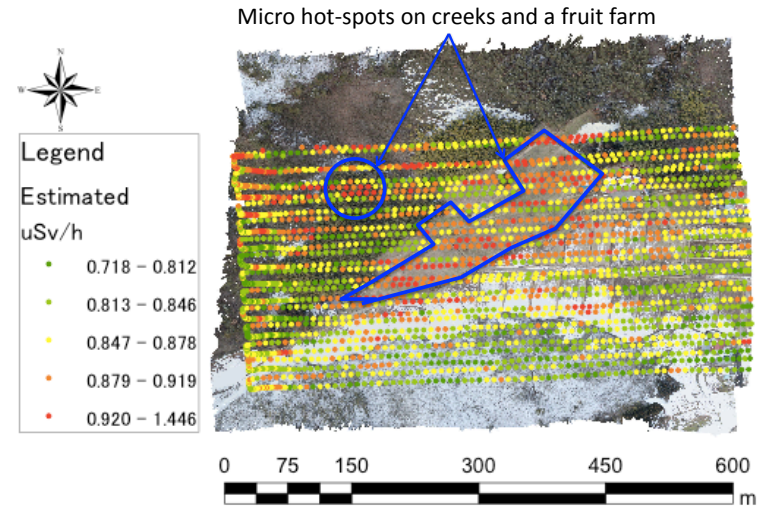
Results: 3D Visualization of DSM



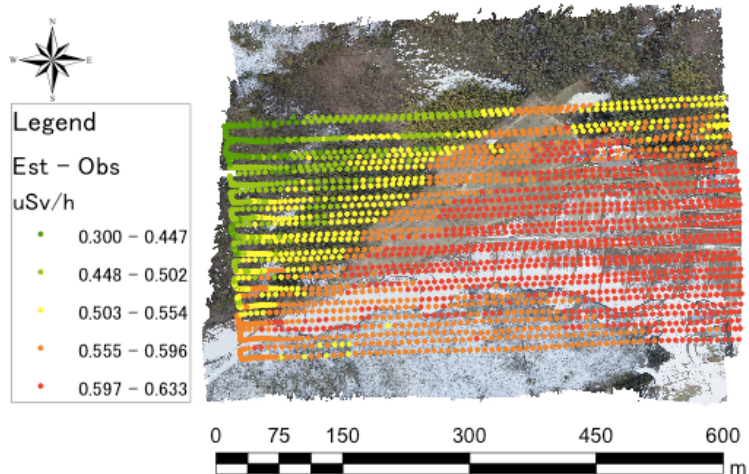
Results: Radiation (before calibration)



Results: Radiation (after calibration)



Results: Radiation (before and after)



Conclusions

- Proposed air-borne survey by UAV is effective for rapid impact assessment of micro-scale disaster or environmental risk events
- Next challenges
 - Estimate contamination of biomass
 - Spatio-temporal analysis of big data by UAV
 - Applications for flood, land-mine removal, etc.