United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

IODE International Oceanographic Data and Information Exchange

OTGA/INIOAS: Remote Sensing of Coral Reefs
20 - 23 October 2019, Tehran, Iran

Iranian National Institute for Oceanography and Atmospheric Science (INIOAS)

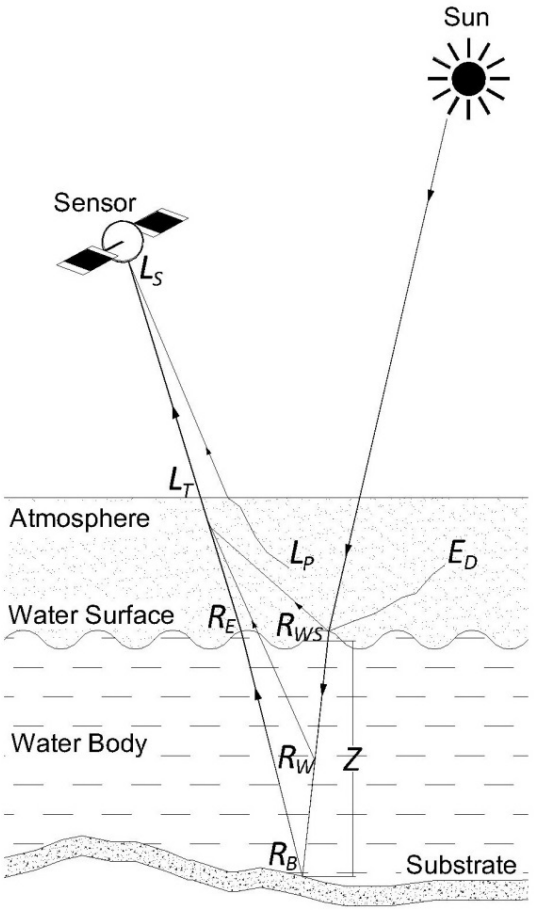
Remote Sensing of the CORAL REEFS

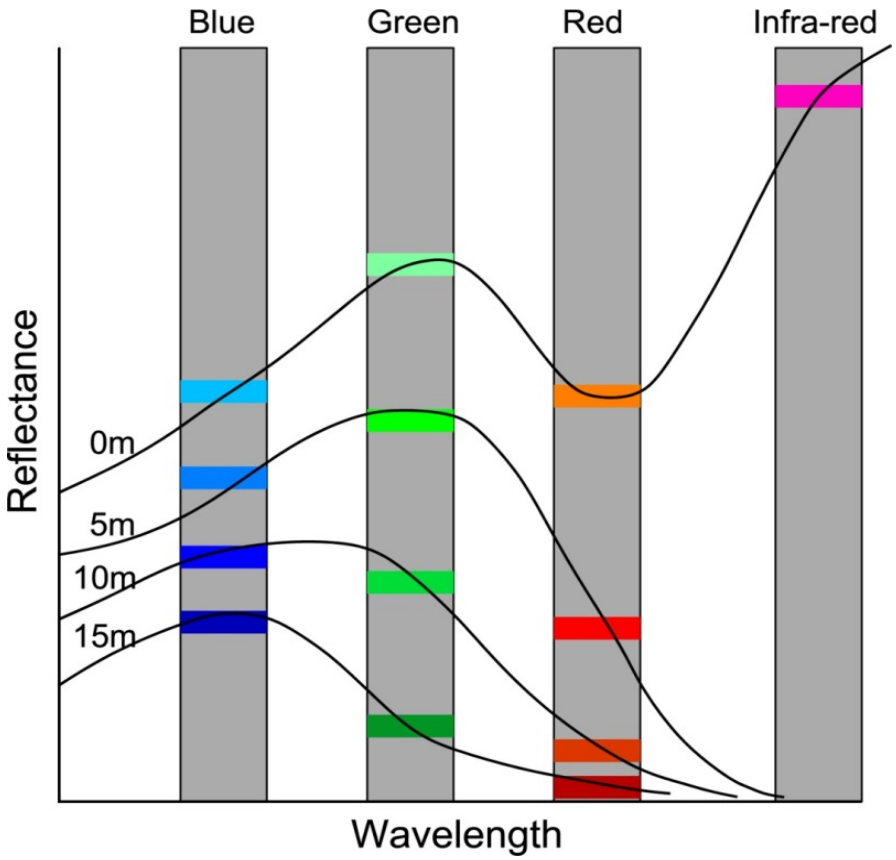
By: Keivan Kabiri
Department of Marine Remote Sensing

Satellite image processing

- **Pre-processing**
  - i. Radiometric correction (Converting raw DN values to Radiance values)
  - ii. Atmospheric correction
  - iii. Water column correction
- **Processing**
  - i. Image classification
- **Post-processing**
  - i. Filtering
  - ii. Raster to vector conversion

$$R_b = \frac{\frac{1}{0.54} R_{rs}(z=a) - \left(1 - e^{-2kz}\right) R_w}{e^{-2kz}}$$





$$R_b = \frac{\frac{1}{0.54} R_{rs}(z=a) - \left(1 - e^{-2kz}\right) R_w}{e^{-2kz}}$$

k = Diffuse attenuation coefficient

z = Depth value

R_w= Mean of reflectance values for a optically deep area in the satellite image

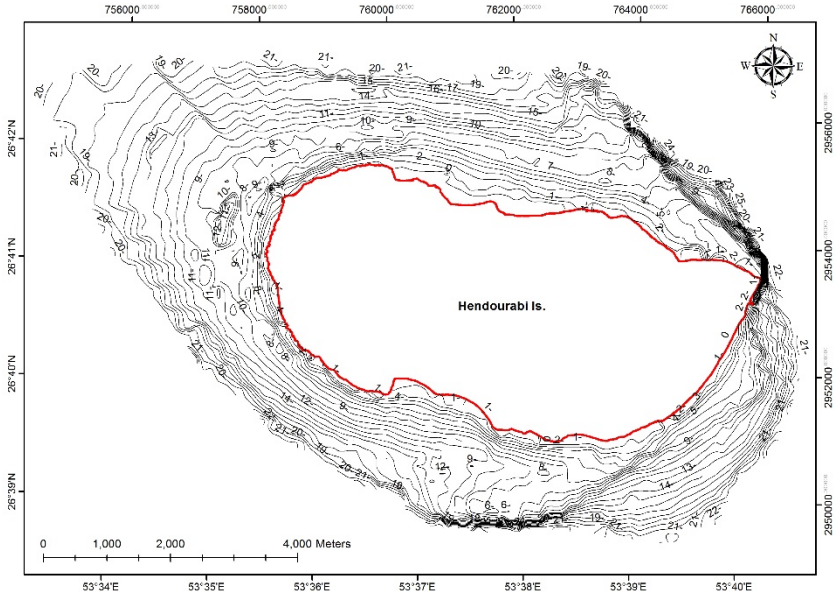
$$k_i = \frac{0.5 \ln\left(\frac{L_{i\,max} - L_{i\,\infty\,mean}}{L_{i\,min} - L_{i\,\infty\,mean}}\right)}{Z_i - Z_j}$$

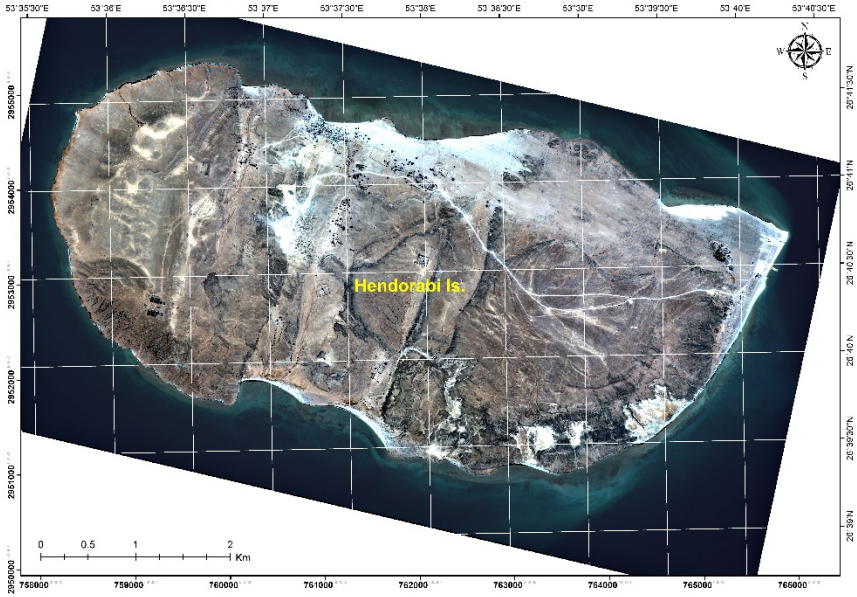
$L_{i\,\infty\,mean}$ = average reflectance value for i^{th} band over deep water

z_i and z_j = the maximum depth of penetration for i^{th} zone and j^{th} zone ($j=i+1$)

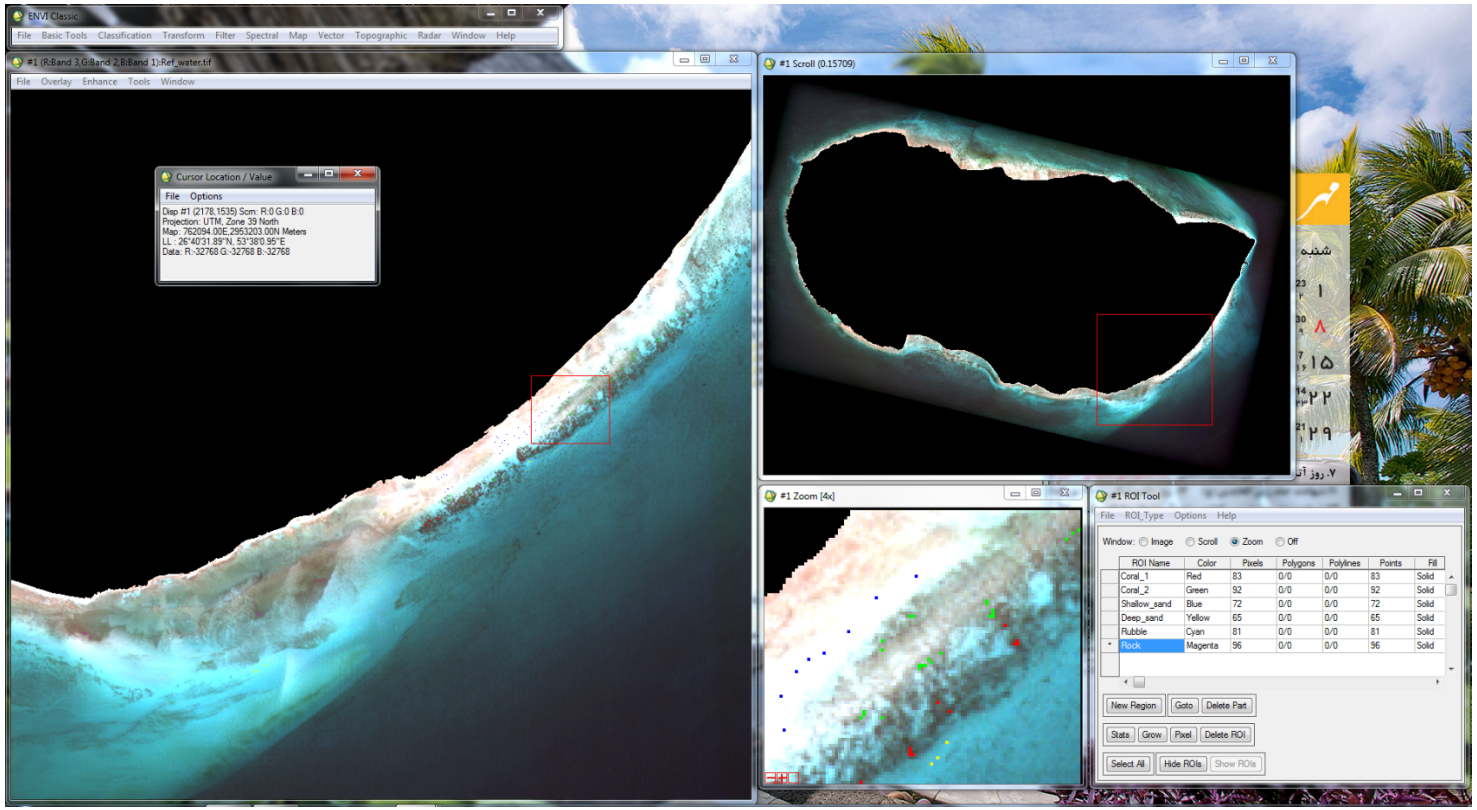
$L_{i\,max}$ and $L_{i\,min}$ = maximum and minimum reflectance values for i^{th} band

Materials





Classification



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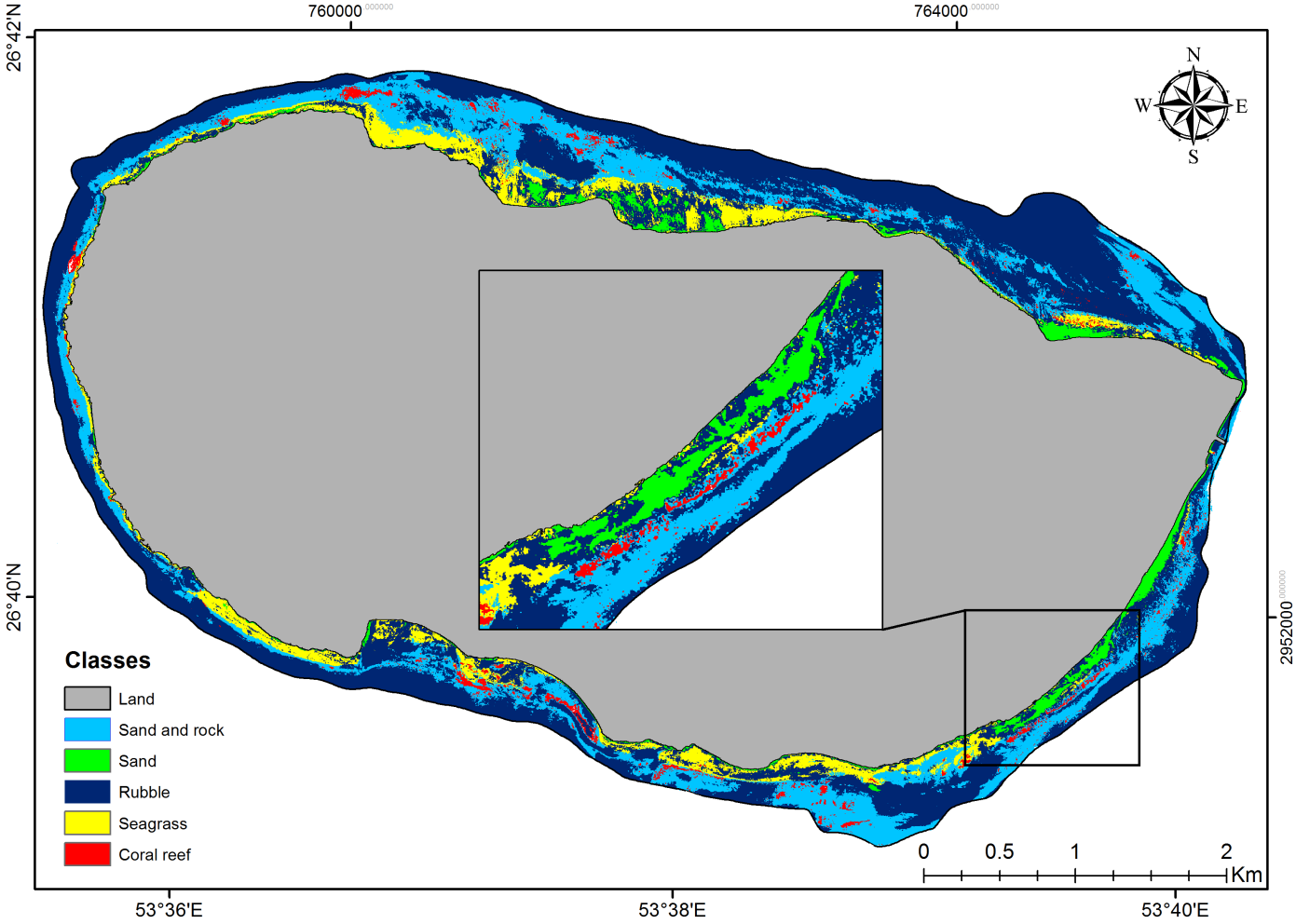
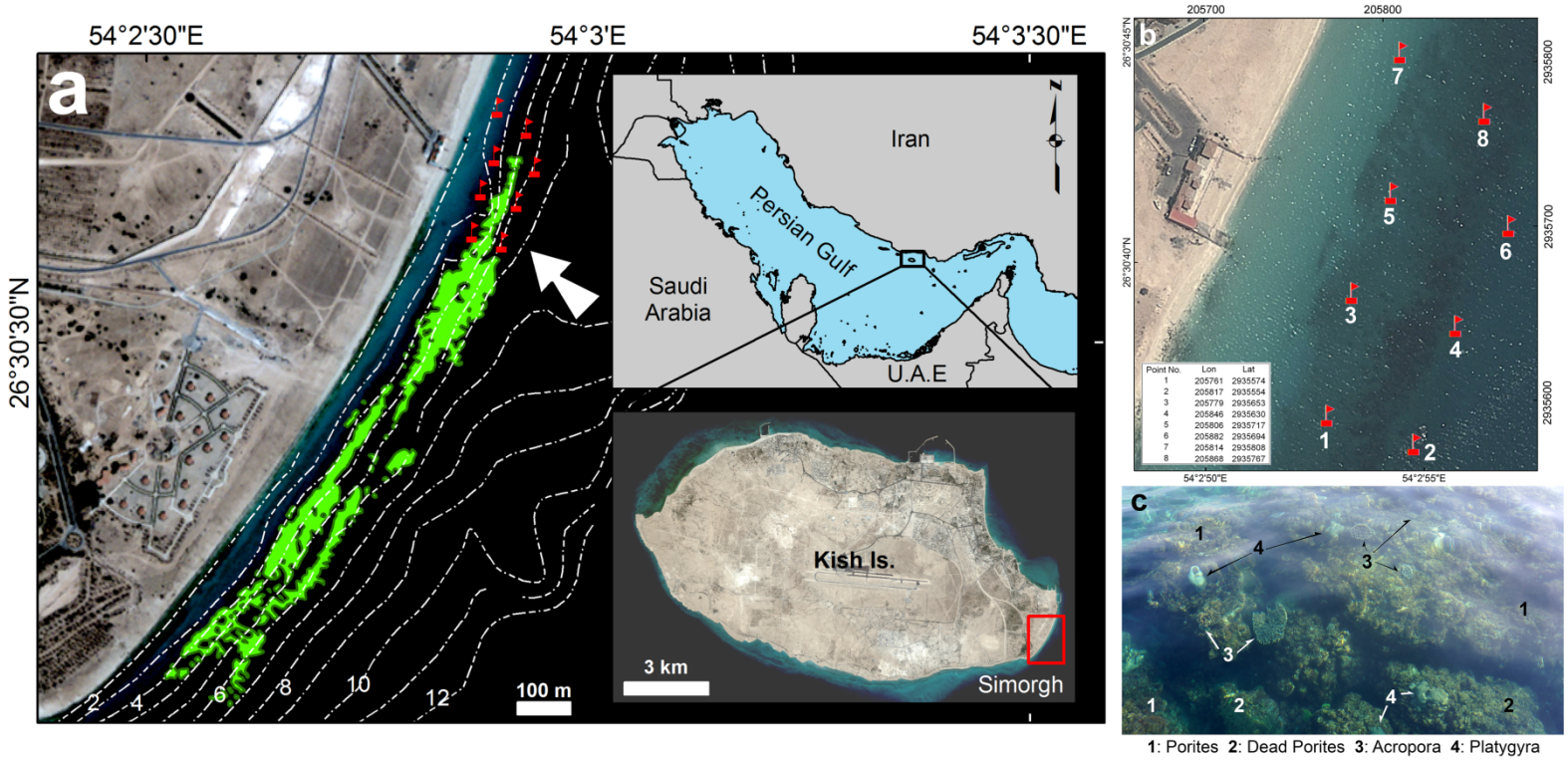


Classified **WorldView-2** satellite image

Spatial Resolution= 1.2 m

Methods for Mapping the CORAL REEFS

- **Remotely sensed** images (Parasailing photography) *(Kabiri et al., 2014)*



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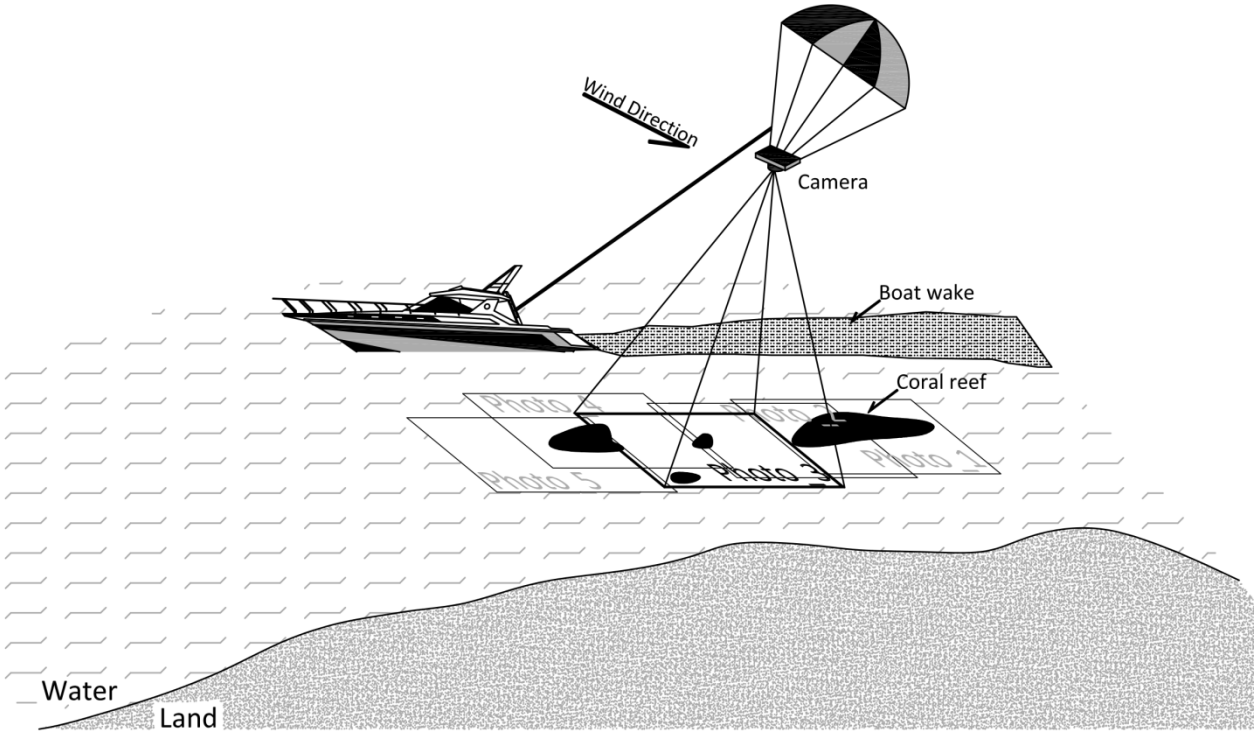

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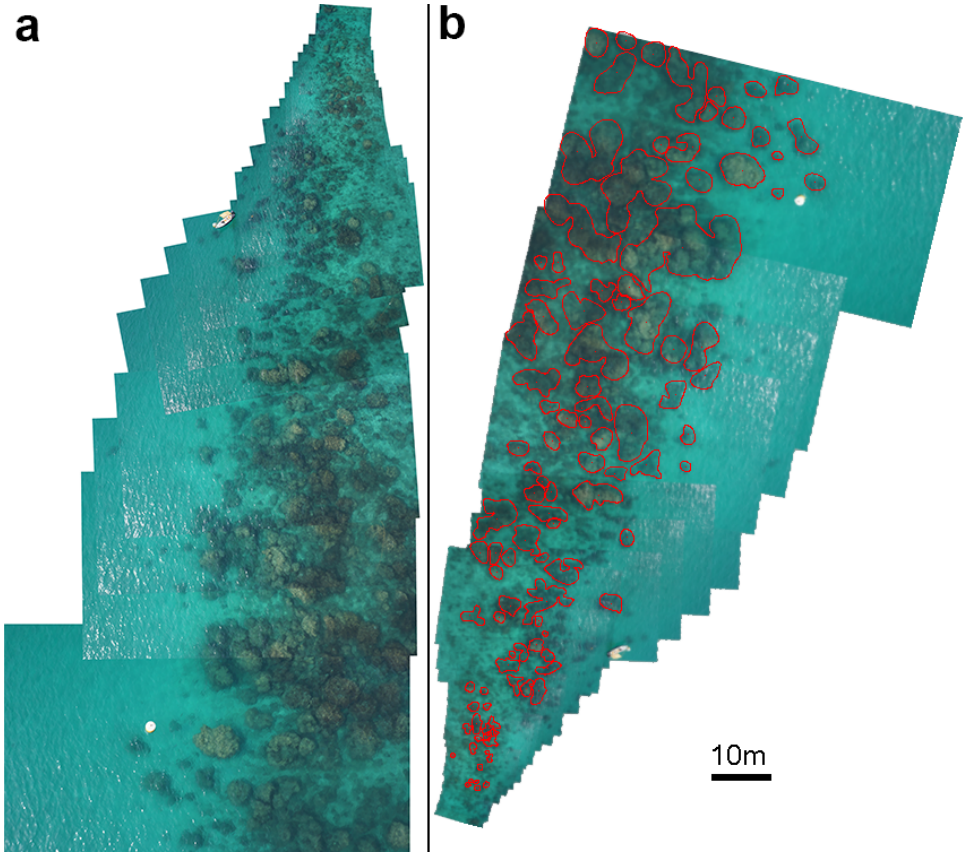
a) Before **Geo-registration**

b) After **Geo-registration**



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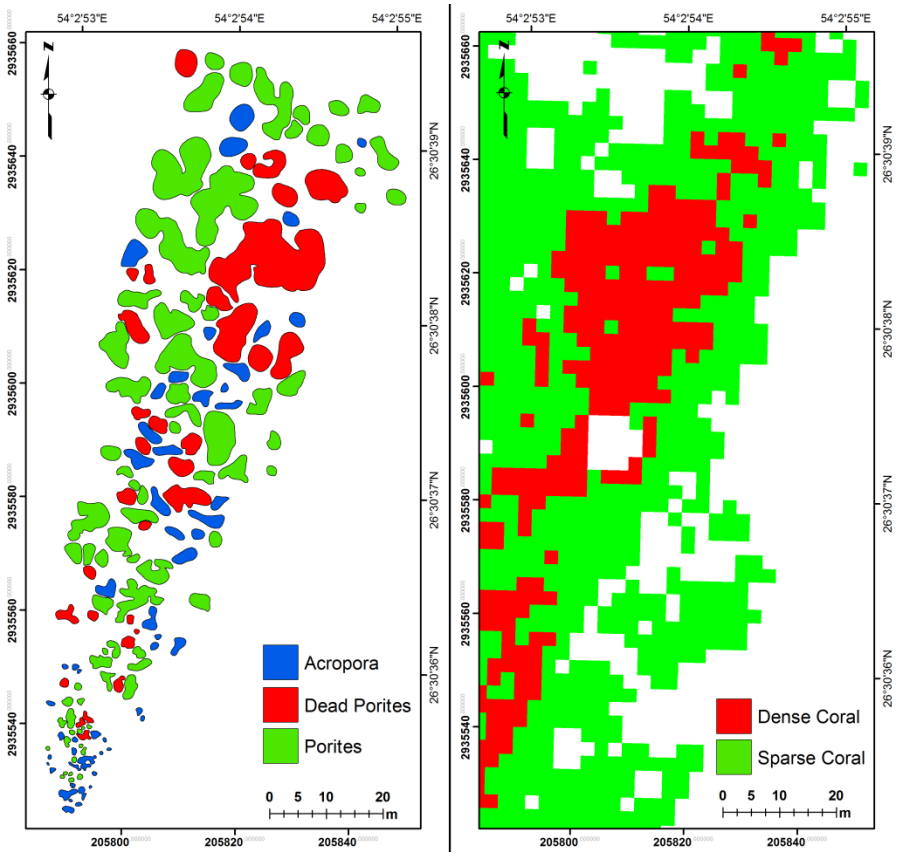
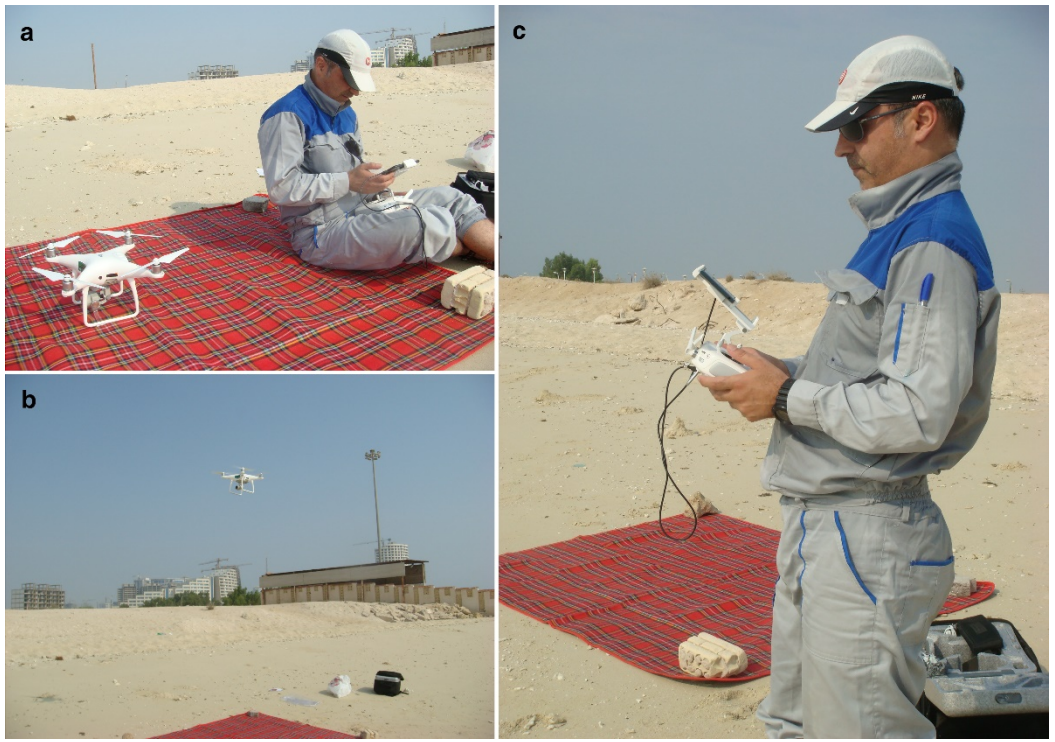
Comparing the results with satellite RS



Methods for Mapping the CORAL REEFS

- **Remotely sensed** images
- (Drone-based)

Under progress...



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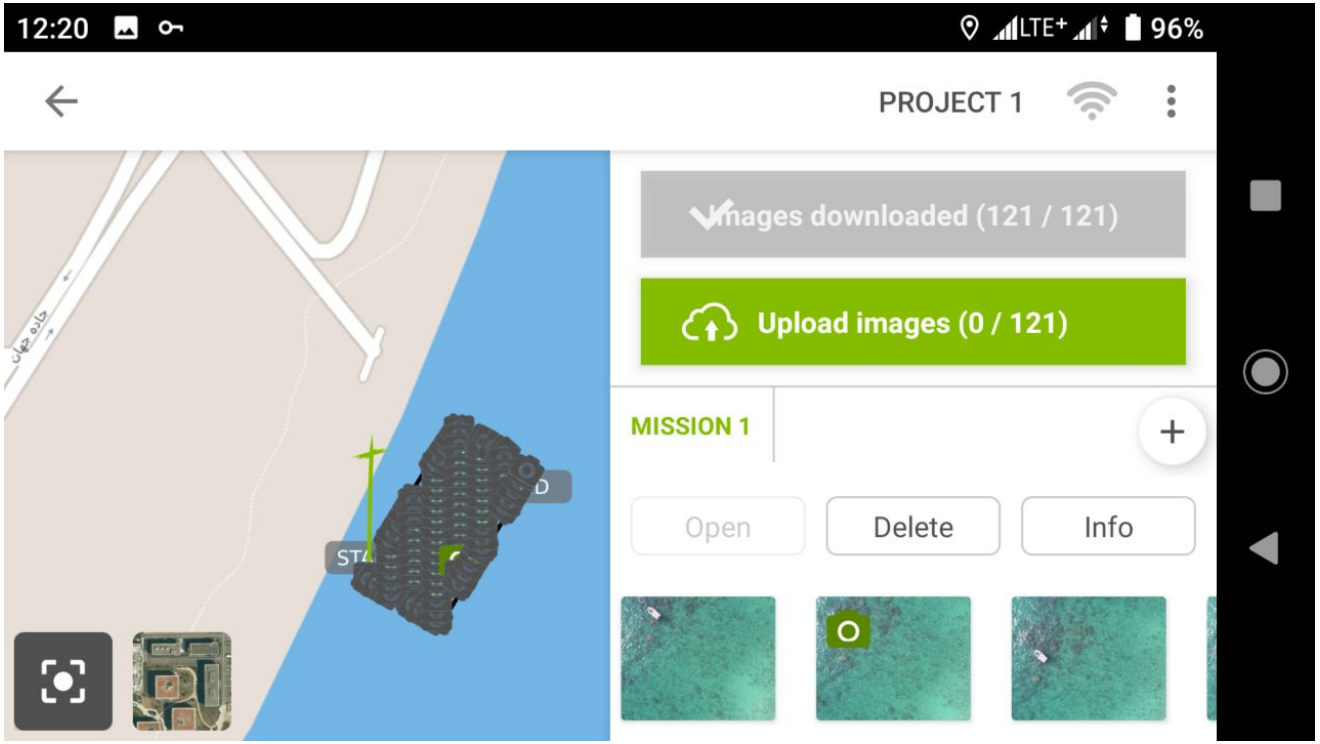

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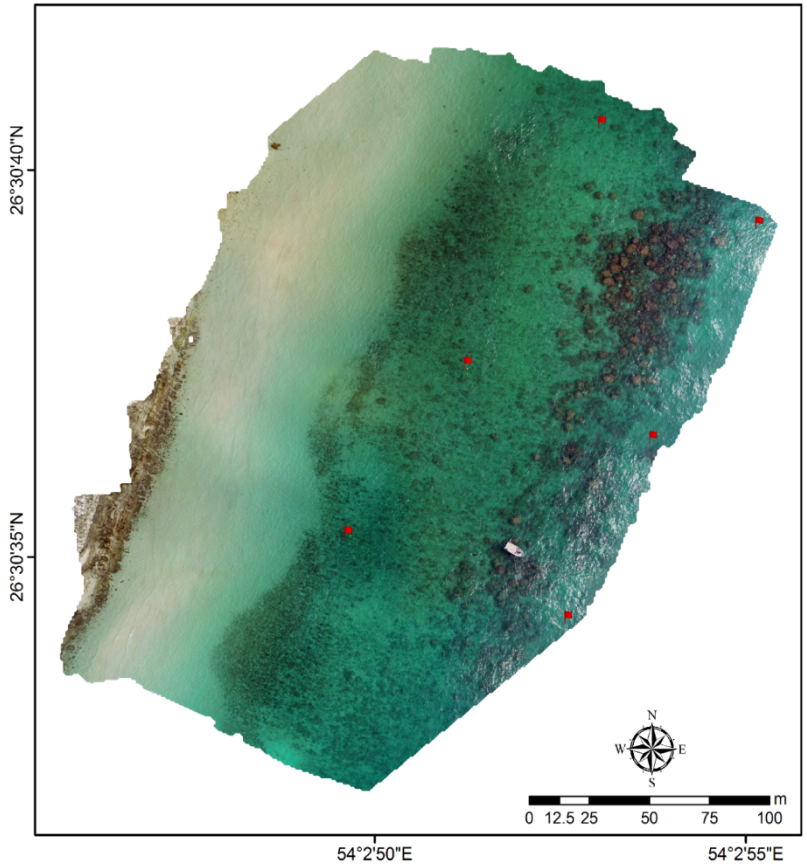


Thanks for your attention