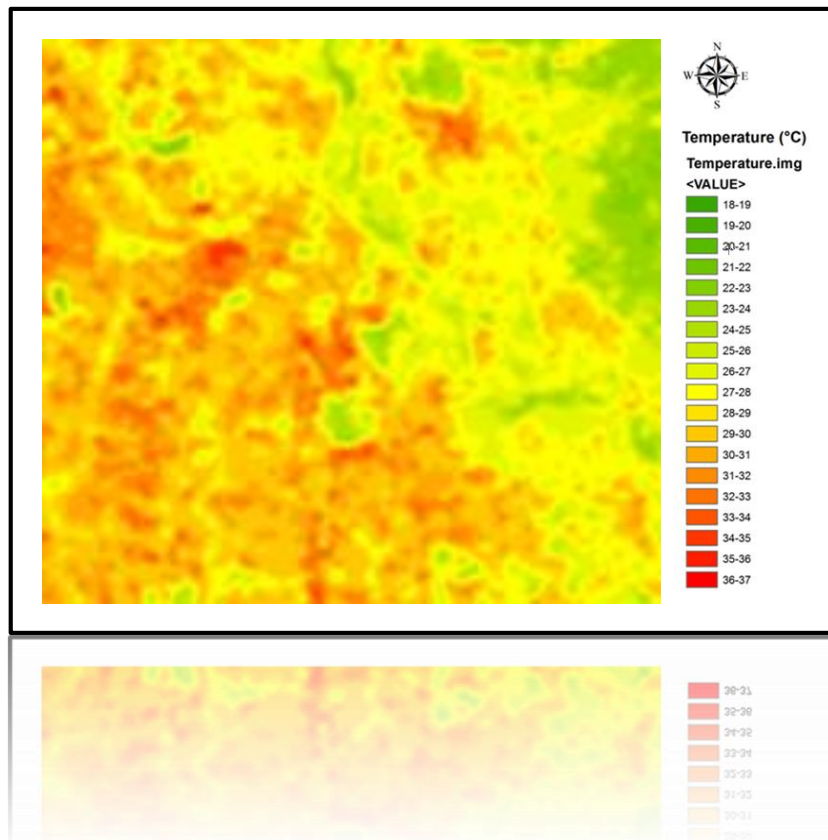


Estimation of Landsat TM Surface Temperature Using ERDAS Imagine Spatial Modeler



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*Design for
beginner to intermediate level*



1. DOWNLOAD TUTORIAL DATA

a) Download tutorial data from following URL.

http://giswin.geo.tsukuba.ac.jp/sis/tutorial/koko/surfacetemp/TM5_SurfaceTemp.zip

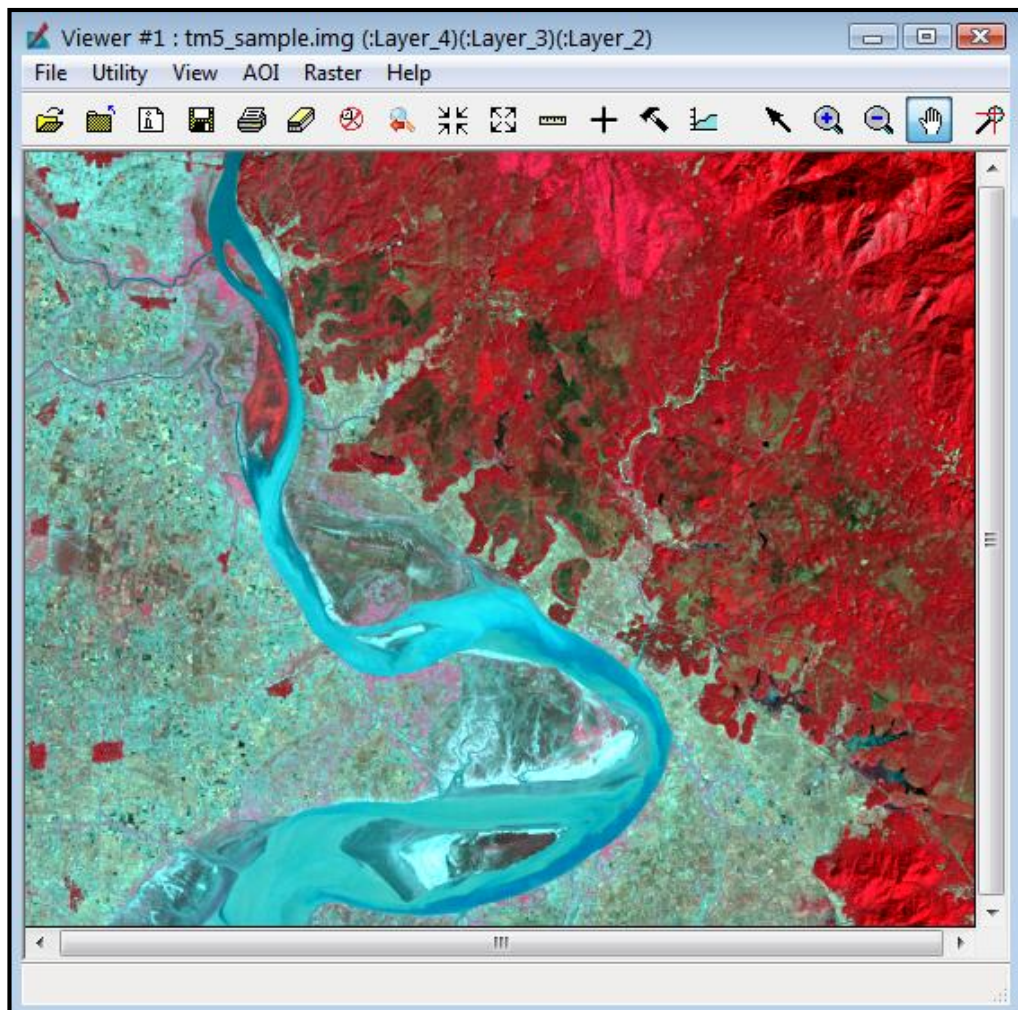
b) Unzip on your hard drive C or D

Example: C:\TM5_SurfaceTemp

Folder contents

1. tm5_sample.img
(Sample Landsat TM, Total 7 Bands and Band 6 is thermal band)
2. Landsat_Temperature.gmd
(ERDAS Spatial Model for calculation of surface temperature)

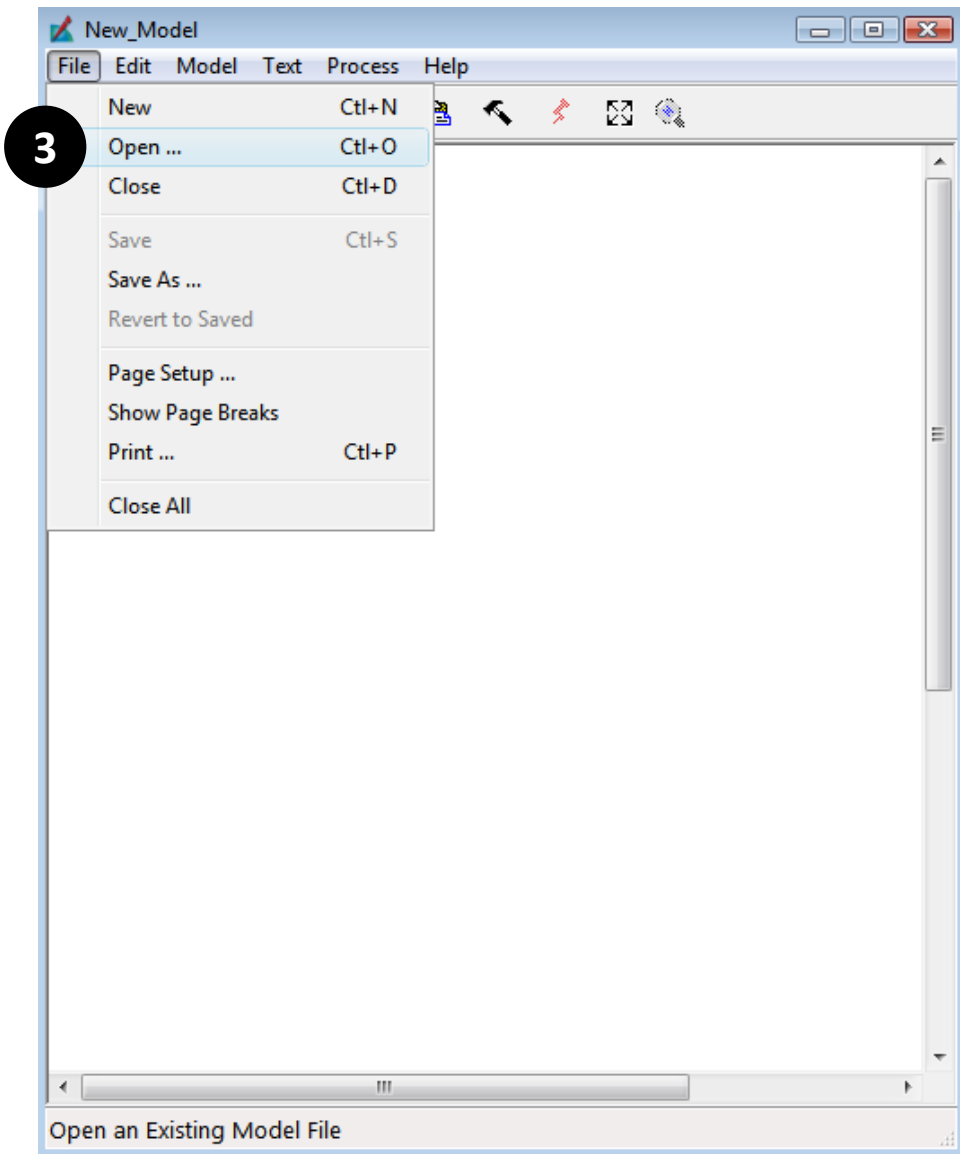
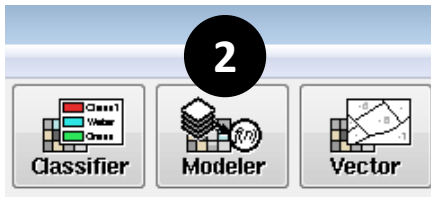
1 Open and have a look Landsat TM RGB-432 (Below figure)



2. CALCULATION

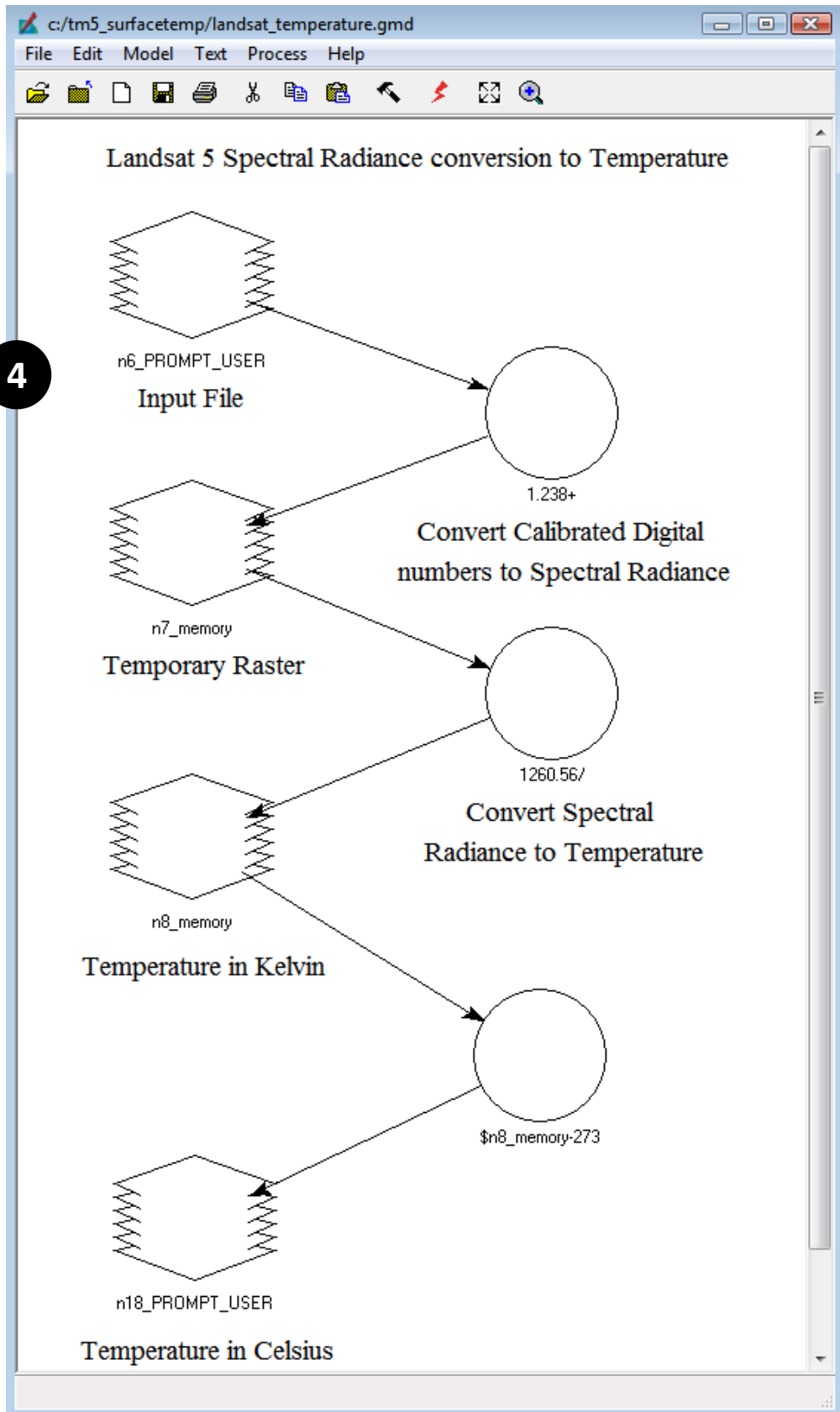
2 Click “Modeler” > “Model Maker”

3 Click File > Open




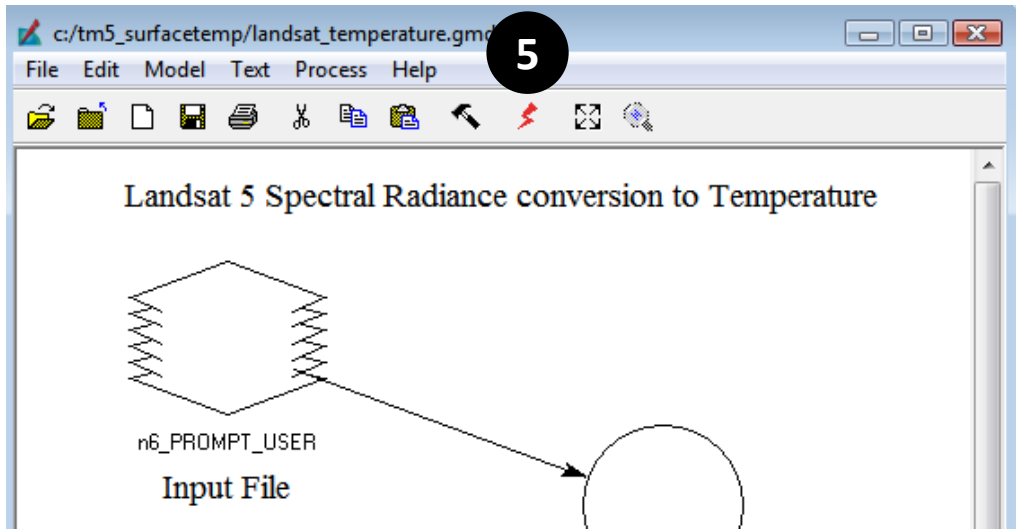
2. CALCULATION

- 4 Insert file “C:\TM5_SurfaceTemp\ Landsat_Temperature.gmd”



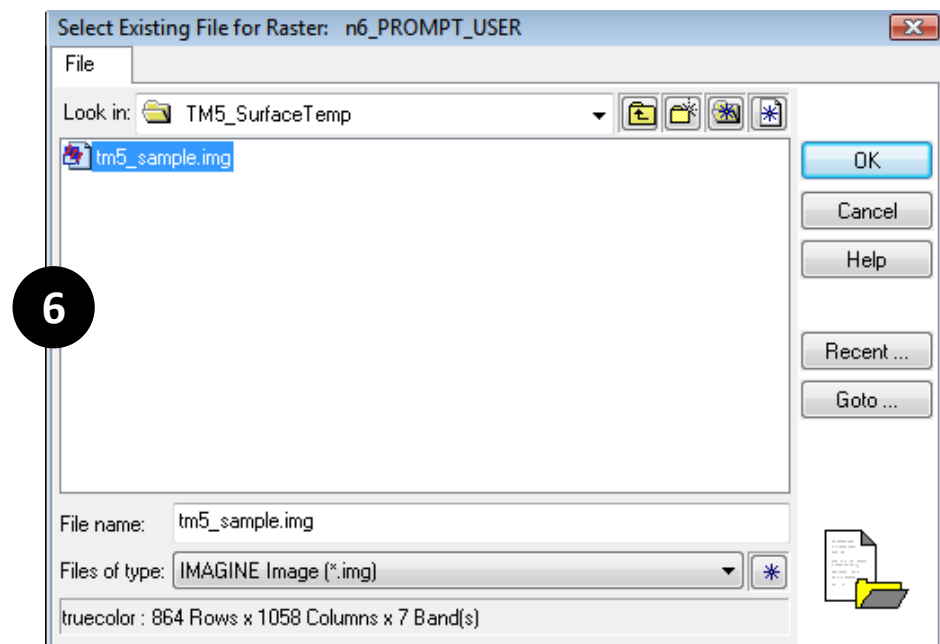
2. CALCULATION

- 5 Click Process > Run (or) Click  icon



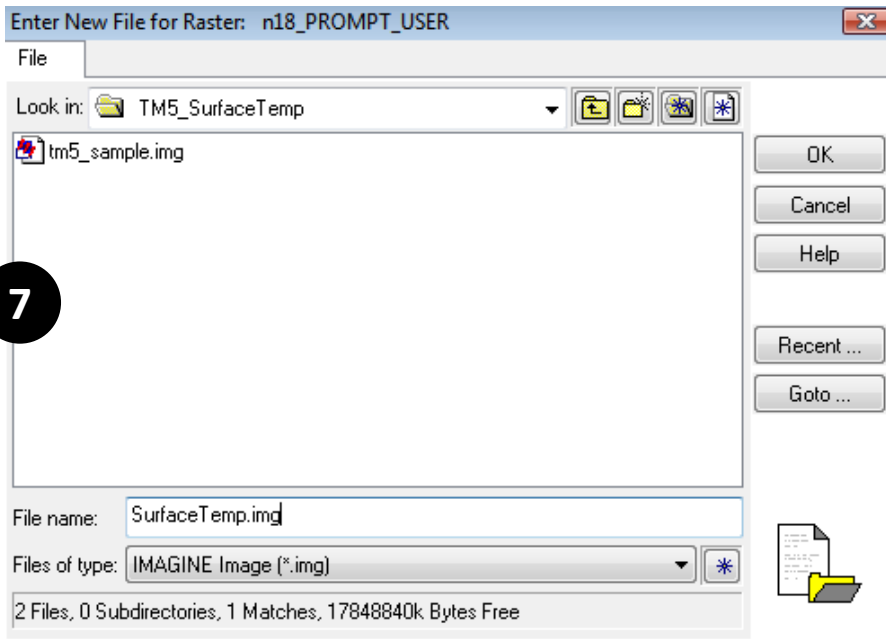
- 6 Insert Landsat TM file for Input (“tm5_sample.img”) and click OK
- 7 Give Output file name, for example: “SurfaceTemp.img”

Note: The file dialogue box will show twice, one for input file and the other for output file.

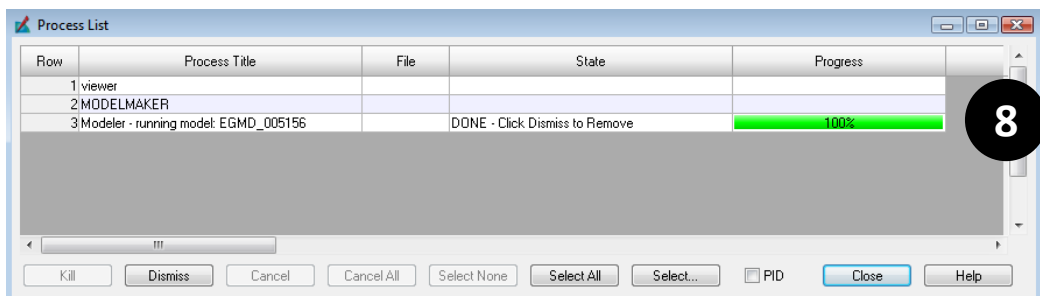


2. CALCULATION


- 7 Give Output file name “SurfaceTemp.img” and click OK.

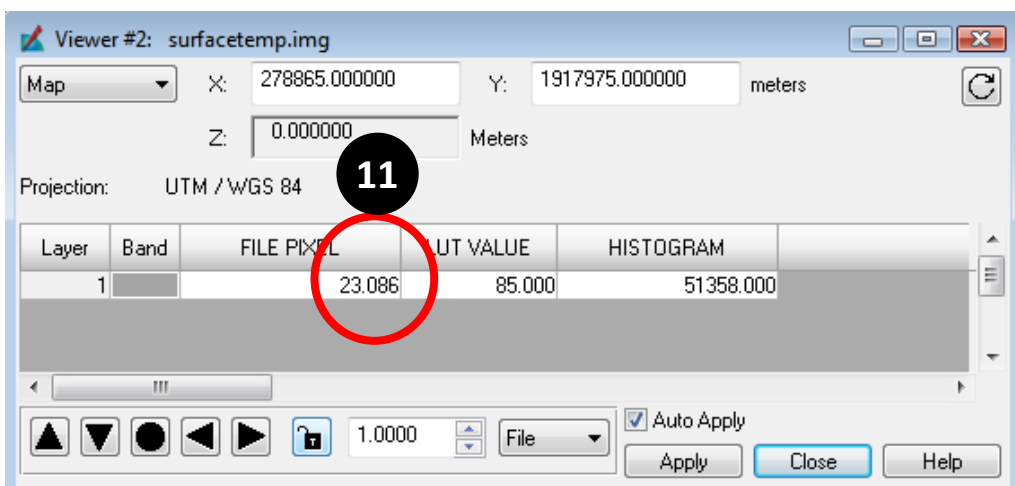
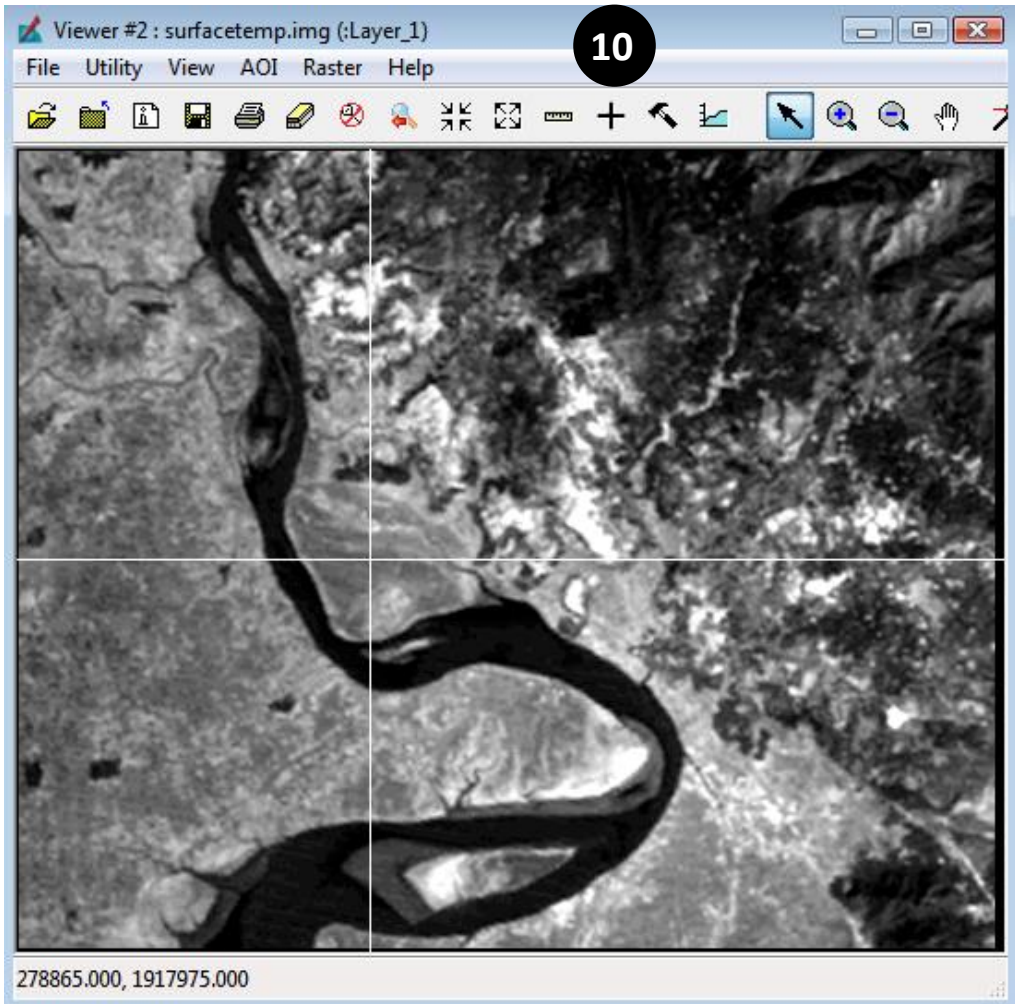


- 8 Check your progress.



3. EVALUATION

- 9 Open “Viewer” and Load your “SurfaceTemp.img” file.
- 10 Click  icon.
- 11 Check your temperature values in Celsius while moving the X-hair.



MODEL EXPLANATION

Step1. Conversion of the Digital Number (DN) to Spectral Radiance (L)

$$L = LMIN + (LMAX - LMIN) * DN / 255$$

Where

L = Spectral radiance

LMIN = 1.238 (Spectral radiance of DN value 1)

LMAX = 15.600 (Spectral radiance of DN value 255)

DN = Digital Number

Step2. Conversion of Spectral Radiance to Temperature in Kelvin

$$T_B = \frac{K_2}{\ln\left(\frac{K_1}{L} + 1\right)}$$

Where

K_1 = Calibration Constant 1 (607.76)

K_2 = Calibration Constant 2 (1260.56)

T_B = Surface Temperature

Step3. Conversion of Kelvin to Celsius

$$T_B = T_B - 273$$

PLEASE NOTE:

You need to change LMIN and LMAX for each thermal scene and you can find these values in satellite header file. To change these parameters, double click on first circle and modify it.

END OF DOCUMENT