Practical Manual

For

Processing MODIS-Aqua satellite ocean colour data using SeaDAS (v6.4)

By

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The manual provided systematic steps for processing data from Moderate Resolution Imaging Spectroradiometer (MODIS) onboard Aqua Satellite (hereafter referred as MODISA) using SeaWiFS Data Ananlysis System (SeaDAS) software. SeaDAS is an open source software developed by NASA-OBPG. The version of SeaDAS (6.4) demonstrated here has capability to process data from satellites MODIS, SeaWiFS, MERIS, OCTS and CZCS using Graphical User Interface (GUI). The main menu of SeaDAS is given as Fig. 1.

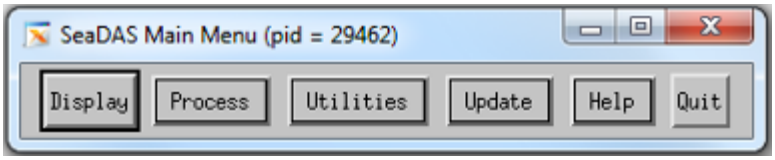

Fig. 1: Schematic showing main menu of SeaDAS

The typical processing flowchart for MODISA data is given as Fig. 2. The processing demonstrated from Level 1A (L1A) to Level 3 (L3). To begin with processing, the first step is to extract geographic co-ordinated from L1A data (L1A to GEO). The next step is to process L1A data to L1B (L1A to L1B). Further ocean colour data products are generated from L1B to L2 using suitable atmospheric correction scheme and bio-optical algorithm. The next step for processing is space binning (L2 to L3) and projection. The projection also involve making an composite image.

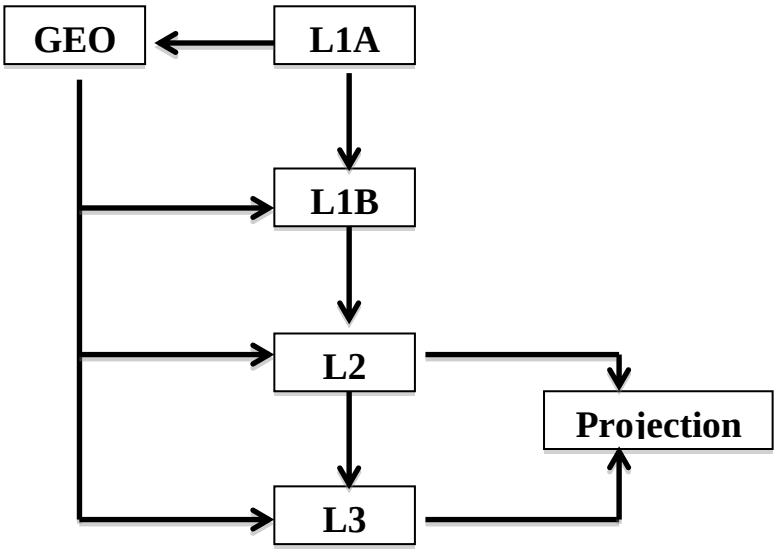

Fig. 2: Typical satellite data processing flow chart

The panel below (Fig. 3) shows processors for MODISA

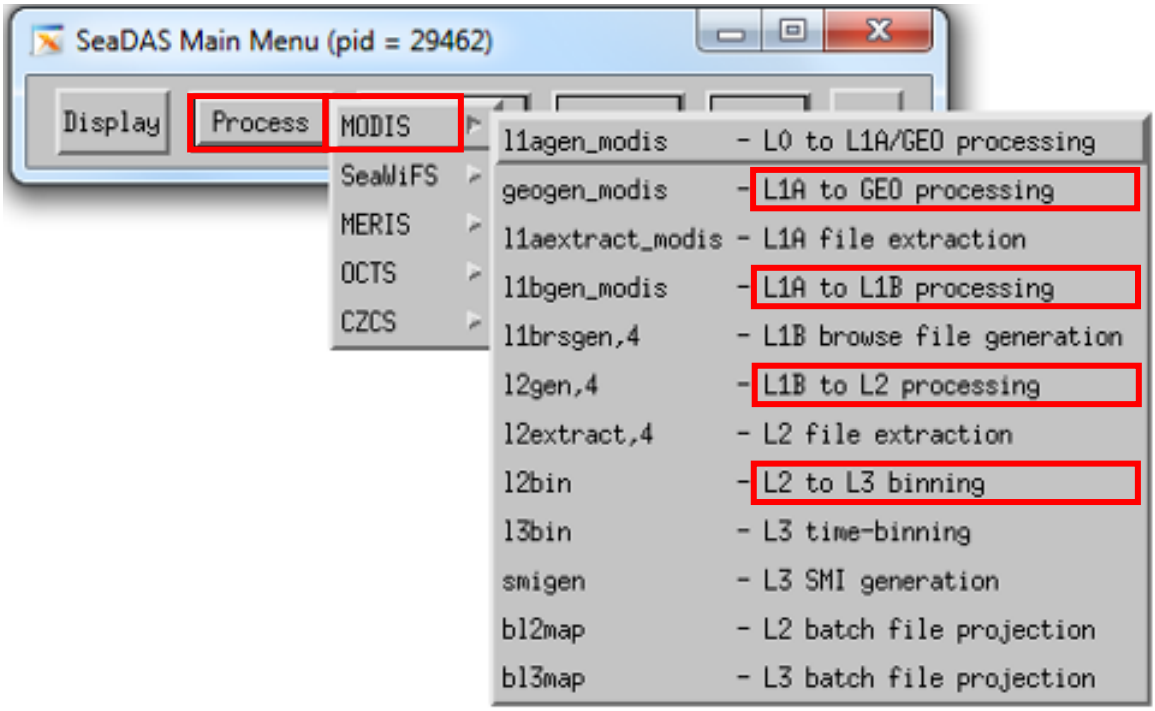

Fig. 3: Schematic showing various processors for MODIS data

Step 1: L1A to GEO processing

Process --> MODIS --> L1A to GEO processing (geogen_modis)

- Select input as L1A file (Fig. 4)
- Output file will appear automatically as GEO
- Click on "Run"

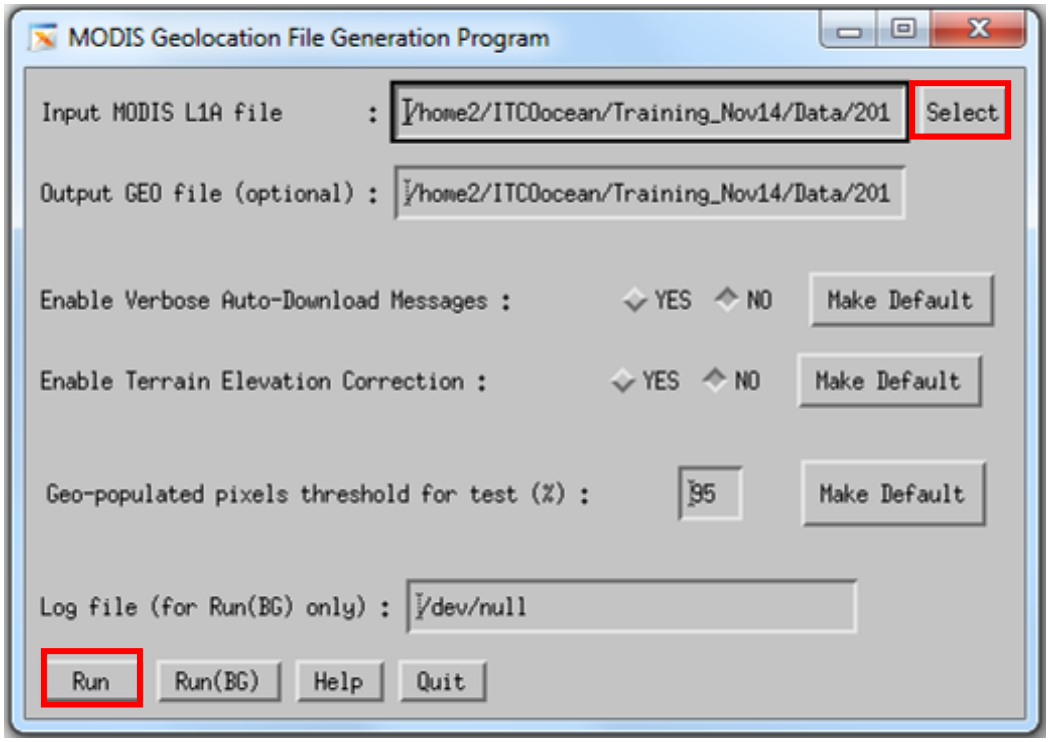

Fig. 4: Schematic showing processing GUI for L1A to GEO

Step 2: L1A to L1B processing

Process --> MODIS --> L1A to L1B processing (l1bgen_modis)

- Select input as L1A file
- The software will automatically acquire GEO file
- The software generates three ourput file at 1 km (L1B_LAC), 500 m (L1B_HKM) and 250 m (L1B_QKM). The user can retain HKM and QKM files as per the application. However LAC is require for further process.
- Click on "Run"

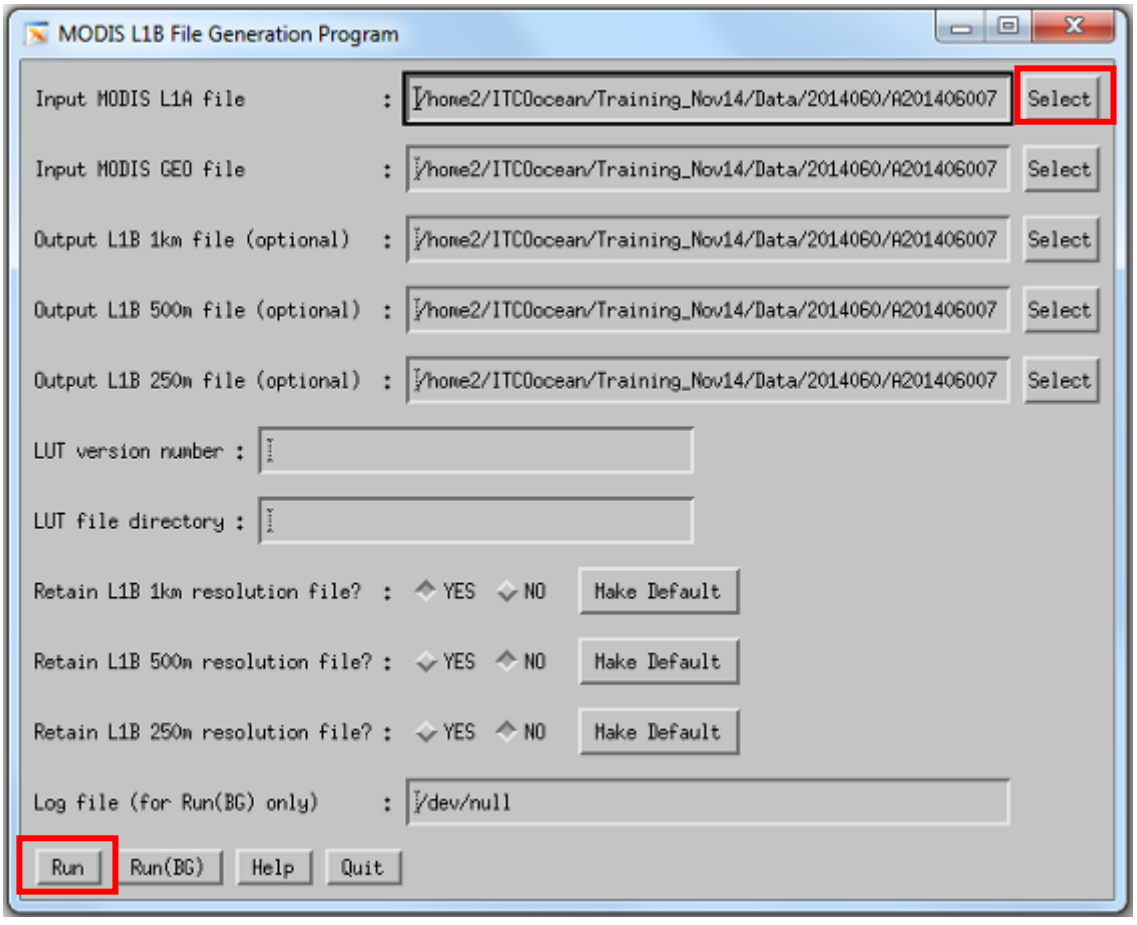

Fig. 5: Schematic showing processing GUI for L1A to L1B

Step 3: L1B to L2 processing

Process --> MODIS --> L1B to L2 processing (l2gen)

- Select input as L1B file (Fig. 6)
- The software will automatically acquire GEO file
- Output file will appear automatically as L2. The software provides option to write maximum four files with desiered products.
- Select L2 products (Fig. 7)
- Click "Okay"
- Click on "Run"

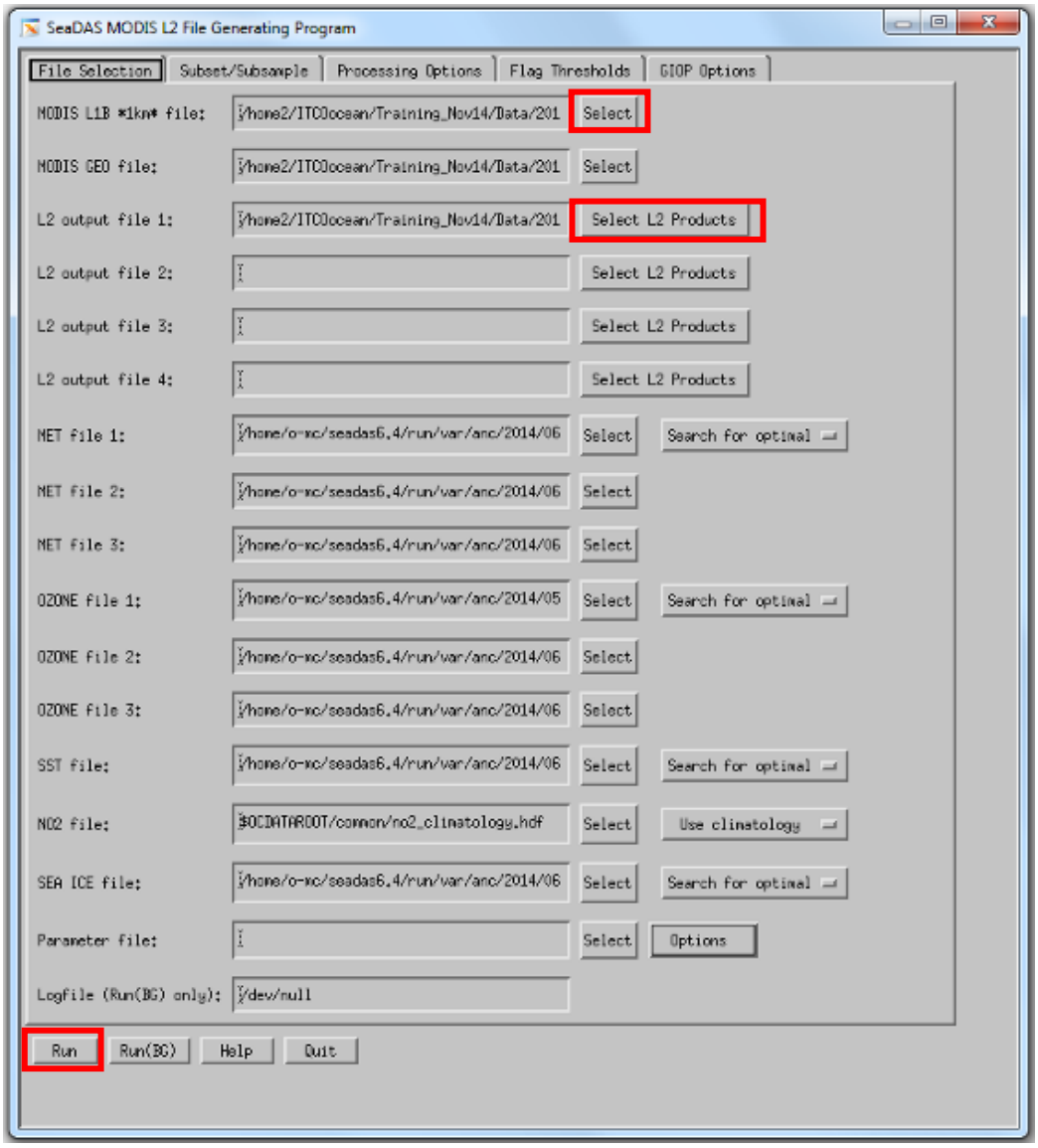

Fig. 6: Schematic showing processing GUI for L1B to L2

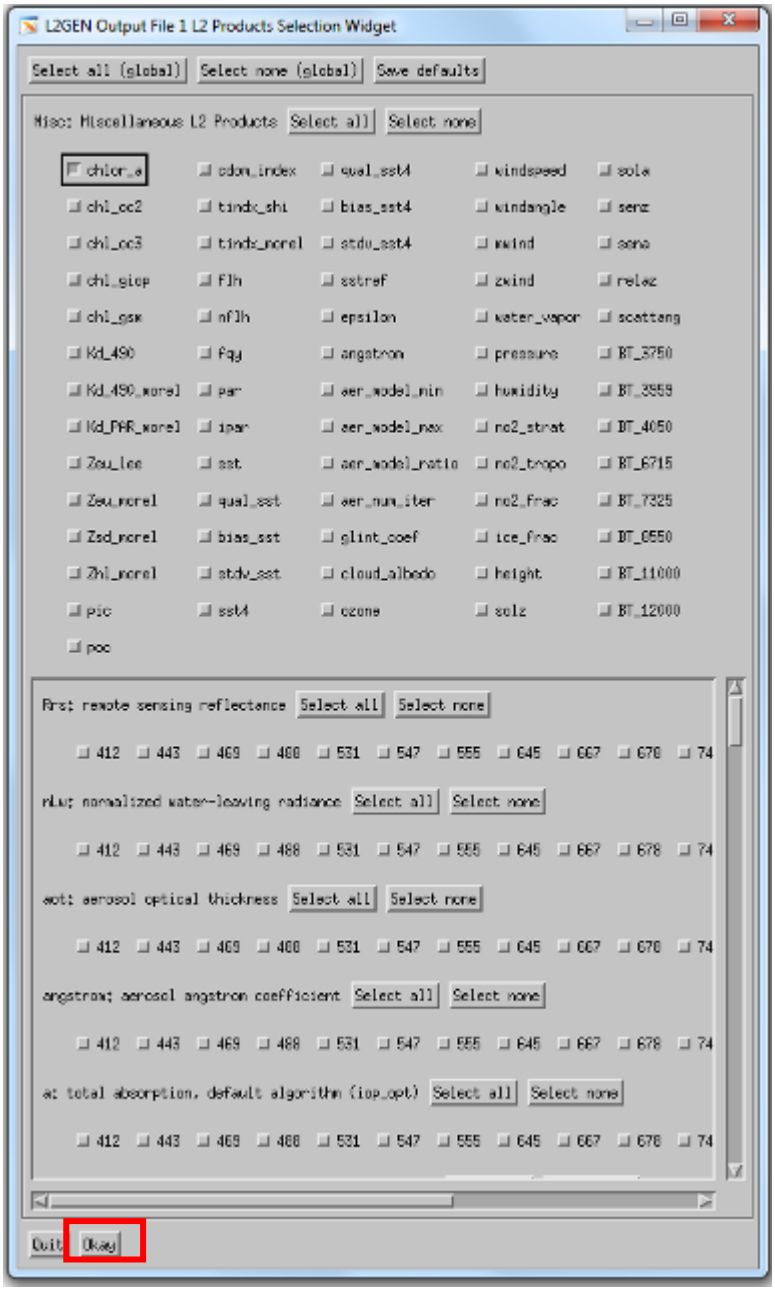

Fig. 7: Schematic showing processing GUI for L2 product selection

Step 4: L2 to L3 space binning (l2bin)

Step 4a: creating a text file

- Use a linux command as shown in Fig. 8 to create a list file

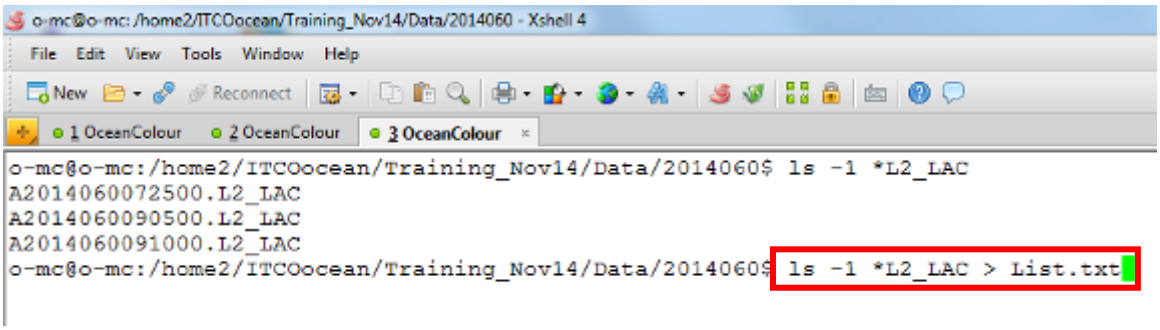

Fig. 8: Schematic showing command line to create text file for spatial binning (L2 to L3)

Step 4b:

Process --> MODIS --> L2 to L3 binning

- Select input as TXT file containing names of L2 files (Fig. 9)
- Select "Resolution", "Products", "Mask"
- Output file will appear automatically as L3b_GAC.
- Click "Run"

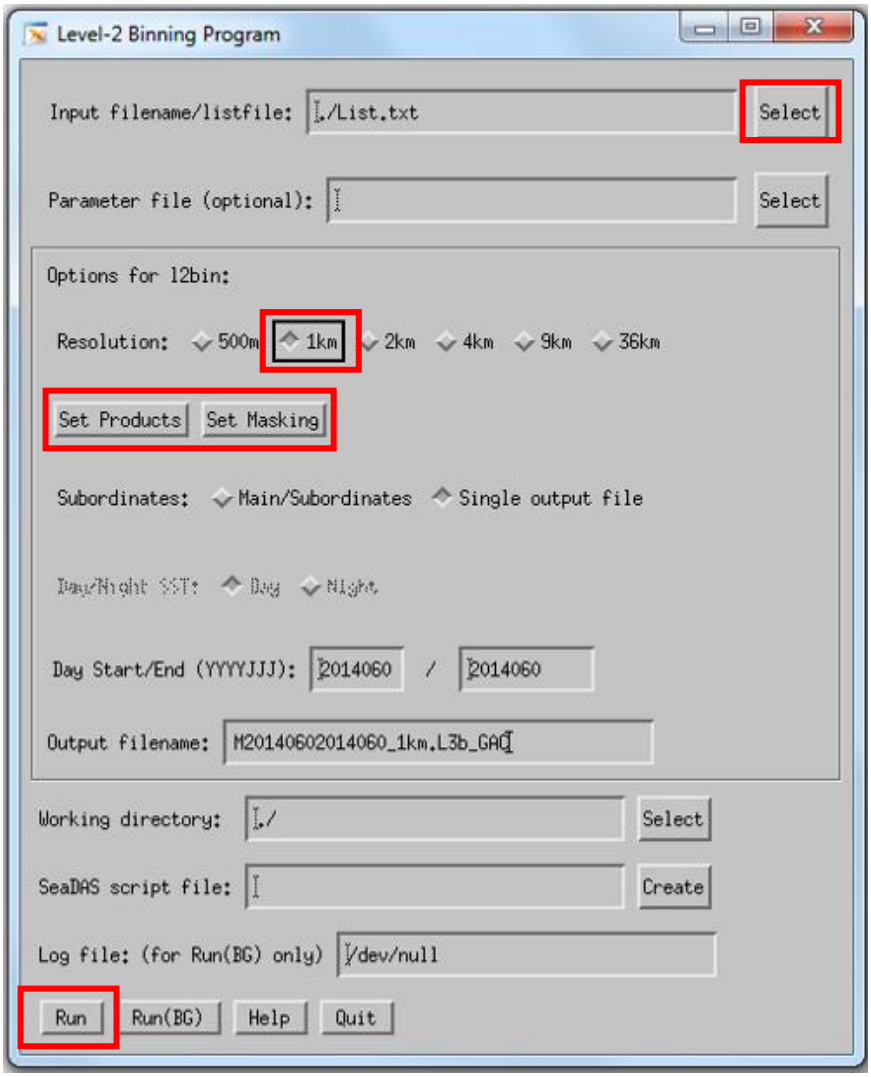

Fig. 9: Schematic showing processing GUI for L2 binning

Step 5: Projection

The projection can be performed at any level. The projection will also make a composite image for many passes.

- Select Display function to load Level 2 data into band list (Fig. 10)

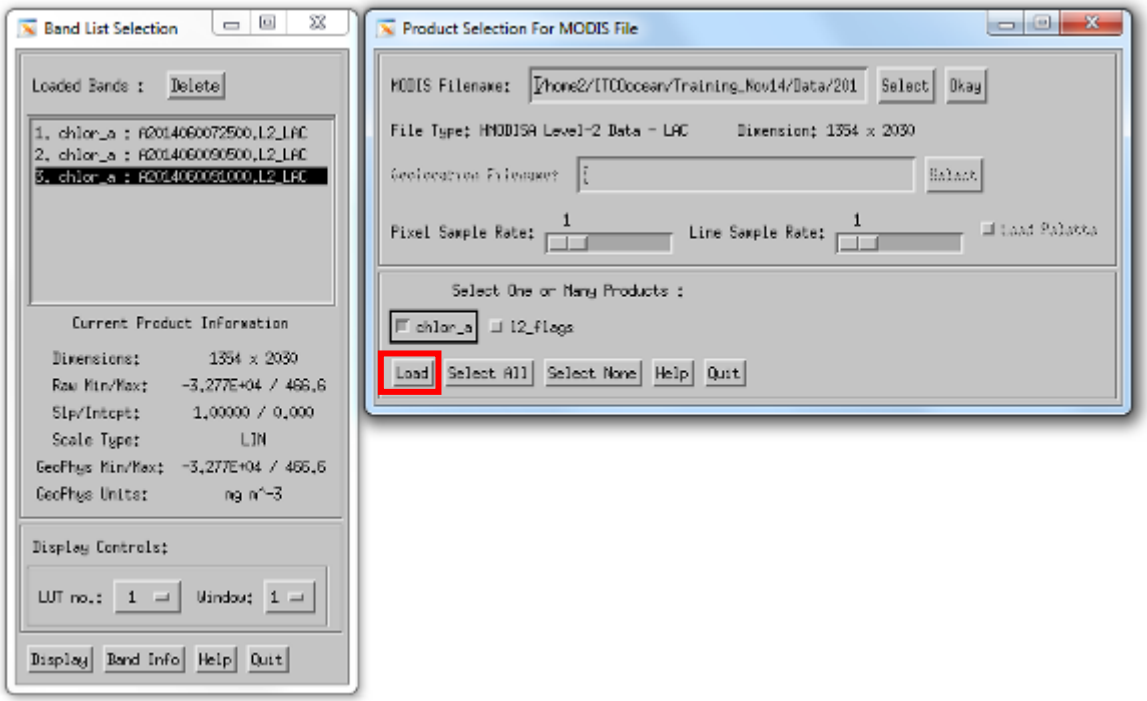

Fig. 10: Schematic showing L2 data loaded into band list GUI

- Open Map projection Window (Fig. 11)

Utilities --> Data Manipulation --> Map projection

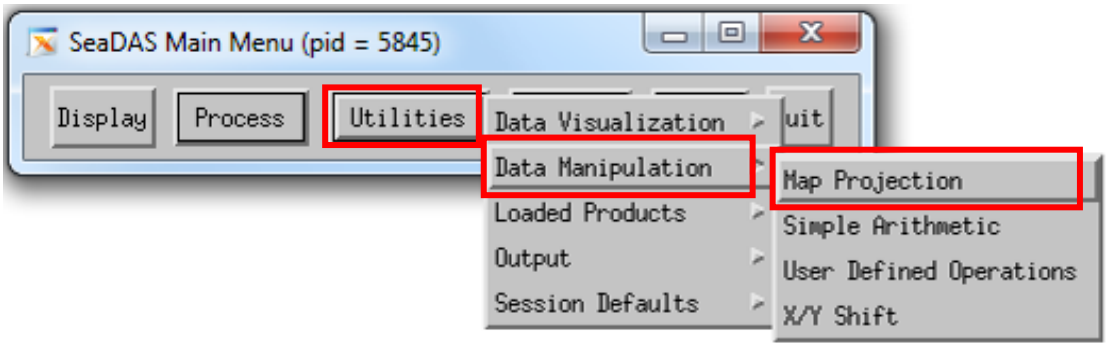

Fig. 11: Schematic showing selection of processoer for projecting L2 data

- The loaded bands will appear in the selection list (Fig. 12)
- Click on bands to be used for projection
- Enter missing value as "-999"
- Select Data Mapping Option as "Composite"
- The other required parameters can be loased from "par" file
- Click on "Go"

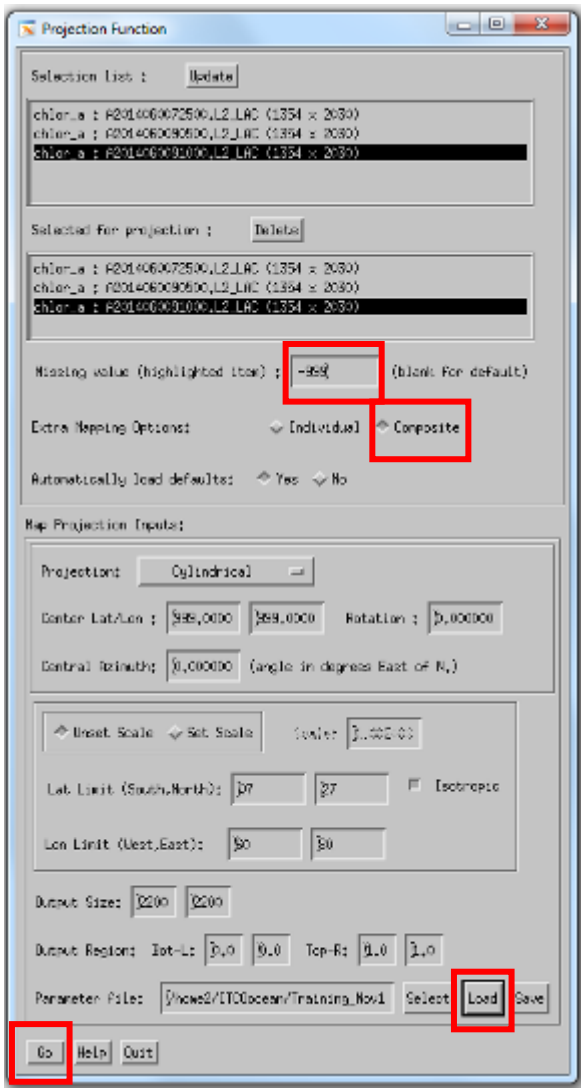

Fig. 12: Schematic showing bands loaded in list for L2 projection

After completion of projection, the "mapped" file will appear in the Band List (Fig. 13)

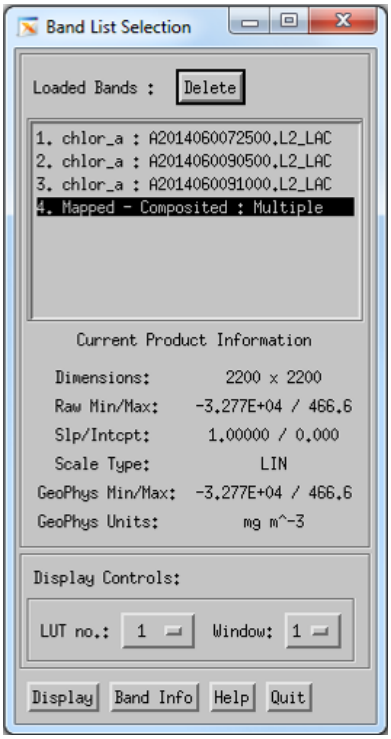

Fig. 13: Schematic showing mapped image loaded in band list GUI

- Select the mapped file and click on "Display"
- The image will appear and can be annoted with various options in Function menu (Fig. 14)
- To save the file use "output" from "Function" menu

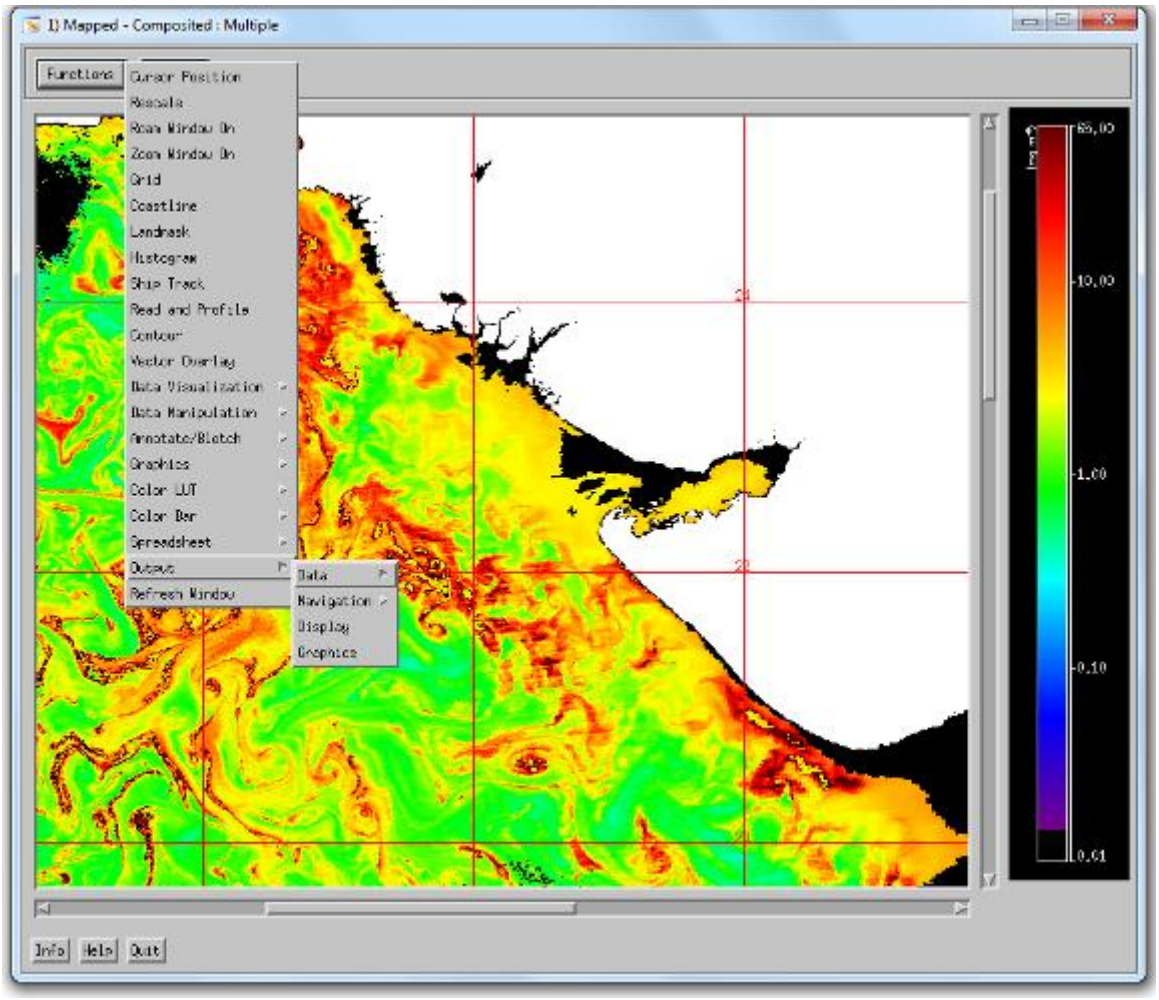

Fig. 14: Schematic showing projeted L2 MODISA image