**How to use iGPS to generate velocity profiles?**

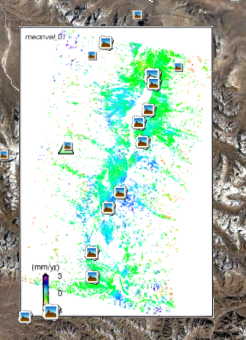
Step1). For InSAR LOS rate map ($iGPS\example\sar\xyz\_profiles\xyz\meanvel\_01.txt) in XYZ format (Fig. 1):

|  |
| --- |
| 91.474576 31.035791 0.505565  91.482076 31.030791 -1.081916  … |

Each line of the XYZ file contains:

*longitude latitude velocity* [*velocity\_uncertainty*]

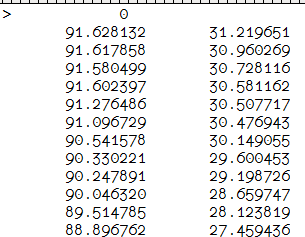
The last column (velocity uncertainty) is optional.



*Fig. 1 InSAR LOS rate map for Gulu Graben, Dangxiong, Lhasa, Tibet, China. Viewed with Google Earth.*

If the LOS rate map is in other formats (e.g. binary grid), one should first convert it to XYZ format. Currently, iGPS does not support other file formats.

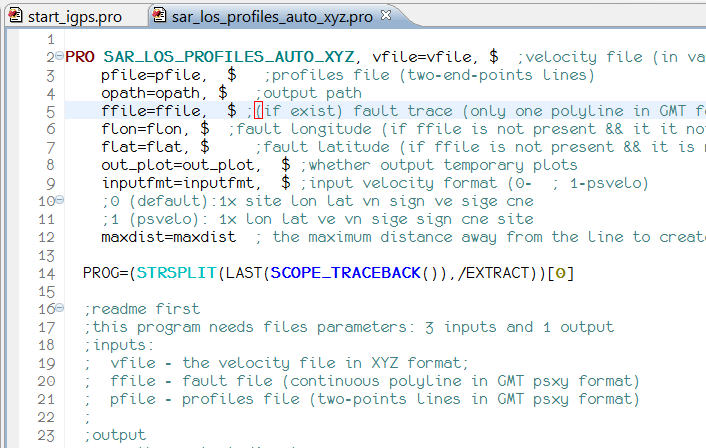
2) Create a fault trace polyline for Yadong-Gulu rift and save it as GMT psxy format ($iGPS\example\sar\xyz\_profiles\fault\_trace\fault\_ydgl2.psxy).

*Fig. 2 Fault trace polyline for Yadong-Gulu fault zone.*

3) Use iGPS program “SAR\_LOS\_PROFILES\_AUTO\_XYZ” to generate velocity profiles.

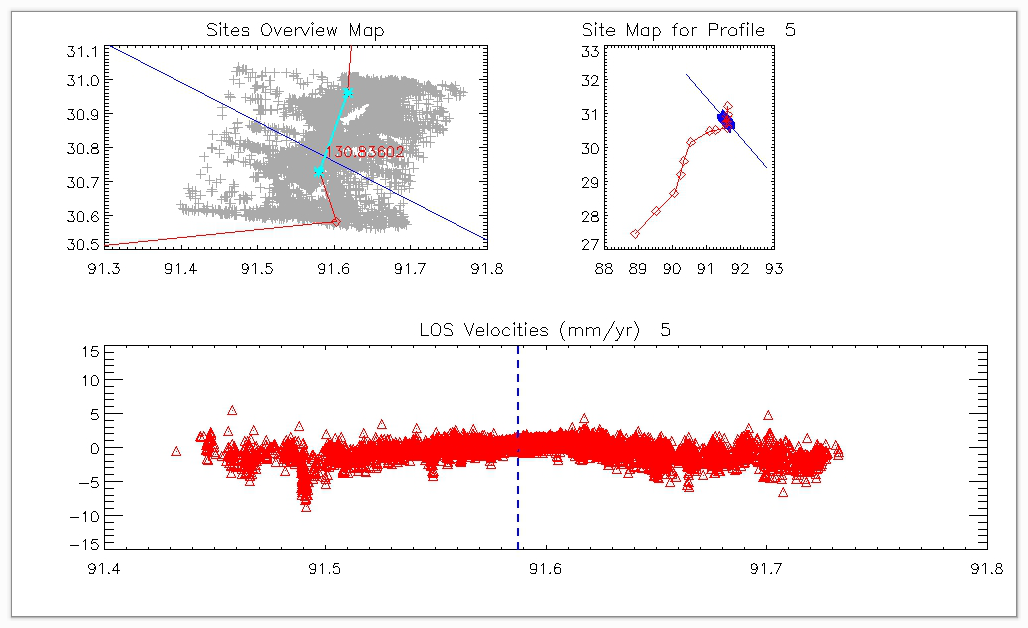
The iGPS main program should be first launched. If not, open the iGPS starter ($iGPS\main\start\_igps.pro) and run it (e.g. by pressing the F8 key), which will set the iGPS environment paths automatically. Then, open $iGPS\sar\sar\_los\_profiles\_auto\_xyz.pro file with IDL Workbench (IDLDE) and set your parameters. Currently, iGPS does not provide a GUI for this program.



*Fig. 3 Open SAR\_LOS\_PROFILES\_AUTO\_XYZ source code in IDL Workbench.*

With the default settings, SAR\_LOS\_PROFILES\_AUTO\_XYZ program will run with the supplied example located at $iGPS\example\sar\xyz\_profiles\ directory. If the output path does not exist, iGPS will create it.

iGPS will create a preview plot for each profile (e.g. Fig. 4).



*Fig. 4 Plot for velocity profile.*

Content of the output velocity profile file looks like:

|  |
| --- |
| # PSXY\_PROFILE 90.440 32.500  # PSXY\_PROFILE 92.809 29.758 *These two lines are profile line.*  # PSXY\_FAULT\_PROFILE\_INTERSECT 91.625 31.129 *This is the intersection point between the profile and fault.*  # PSXY\_FAULT\_TRACE 91.628 31.220 *The below points represent the fault trace.*  # PSXY\_FAULT\_TRACE 91.618 30.960  # PSXY\_FAULT\_TRACE 91.580 30.728  # PSXY\_FAULT\_TRACE 91.602 30.581  # PSXY\_FAULT\_TRACE 91.276 30.508  # PSXY\_FAULT\_TRACE 91.097 30.477  # PSXY\_FAULT\_TRACE 90.542 30.149  # PSXY\_FAULT\_TRACE 90.330 29.600  # PSXY\_FAULT\_TRACE 90.248 29.199  # PSXY\_FAULT\_TRACE 90.046 28.660  # PSXY\_FAULT\_TRACE 89.515 28.124  # PSXY\_FAULT\_TRACE 88.897 27.459  \* site p\_long p\_lati p\_dist v\_along ve\_along v\_tang ve\_tang long lati dist\_to\_fault v\_los ve\_los  1165 91.709 31.031 -4.99 0.00 0.00 0.00 0.00 91.673 30.999 13.603498 -0.47 0.00  1151 91.710 31.031 -4.92 0.00 0.00 0.00 0.00 91.673 30.999 13.619490 -0.51 0.00  1166 91.710 31.030 -4.92 0.00 0.00 0.00 0.00 91.673 30.999 13.660586 -0.89 0.00  1171 91.710 31.030 -4.94 0.00 0.00 0.00 0.00 91.673 30.999 13.682630 -0.43 0.00 |

The data section of the profile file is velocity along the profile. The columns are

* site: site name (each point in LOS map);
* p\_long: longitude of the point by projecting the site (LOS point) to the profile;
* p\_lati: latitude of the above point;
* p\_dist: distance from the LOS point to the profile;
* v\_along: velocity along the profile (not valid for InSAR LOS velocity);
* ve\_along: uncertainty for the above;
* v\_tang: velocity perpendicular to the profile (strike-slip component);
* ve\_tang: uncertainty for the above;
* long: longitude of the LOS point;
* lati: latitude of the LOS point;
* dist\_to\_fault: distance from the LOS point to the fault trace (vary between negative and positive from the left to the right)
* v\_los: LOS velocity
* ve\_los: LOS velocity uncertainty