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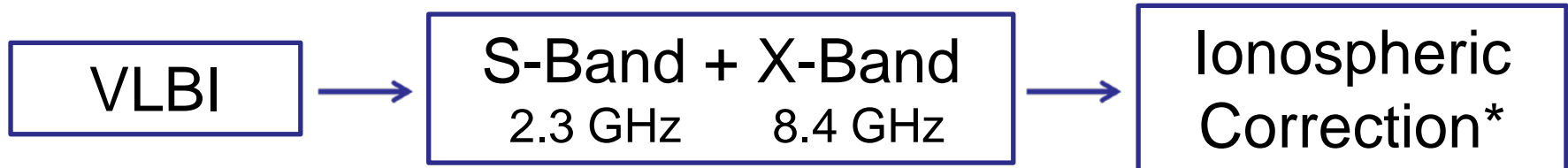
External Ionospheric Files

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VieVS User Workshop
11 – 13 September, 2012
Vienna



Introduction



GILCREEK	KOKEE	0955+476	2005	09	12	17	03	35.0000000000		101
5907466.74180583		.00911		-518100.7480532597		.02993	0	I		102
.00148	.00000	.00000	.00000	.00000	1.282327511207476	0.				103
.00	.0	.00	.0	.00	.0	.00	.0			104
-.00885	-.02658	.00000	.00000	.00000	.00000	.00000	.00000			105
8.511	15.510	968.200		890.400	88.634	95.100	0 0			106
1.0633879006		.00375		-.0616046599		.00809	0			108
5907466.74180583		.02679		-518100.7480532597		.30513	0	I		109
GILCREEK	SVETLOE	0955+476	2005	09	12	17	03	35.0000000000		201
8889103.16206228		.00733		747816.3074107767		.02407	0	I		202
.00184	.00000	.00000	.00000	.00000	2.878212147051463	0.				203
.00	.0	.00	.0	.00	.0	.00	.0			204
-.00885	-.19925	.00000	.00000	.00000	.00000	.00000	.00000			205
8.511	15.000	968.200		1002.600	88.634	100.000	0 0			206
.0392877245		.00273		.0209398746		.00591	0			208
8889103.16206228		.02381		747816.3074107767		.31833	0	I		209

Fragment from VLBI observation file (NGS file)

* Ionospheric delay depends on number of free electrons along ray path

Introduction

Problem!!

Sometimes not possible to observe
in two frequencies

Solution:

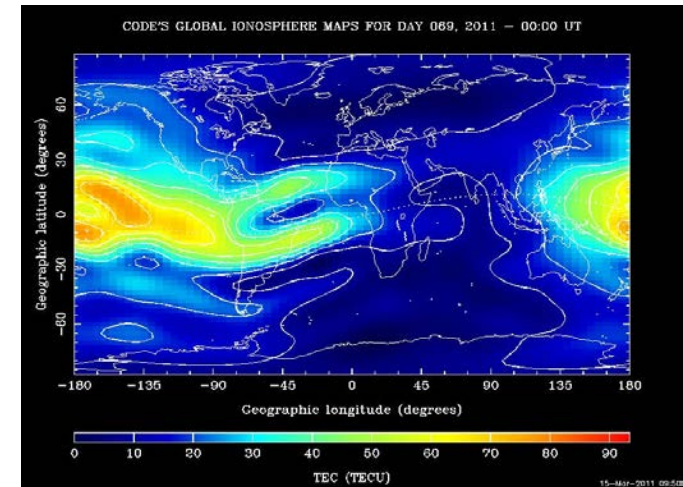
Use of external ionospheric file!!

External Ionospheric Files

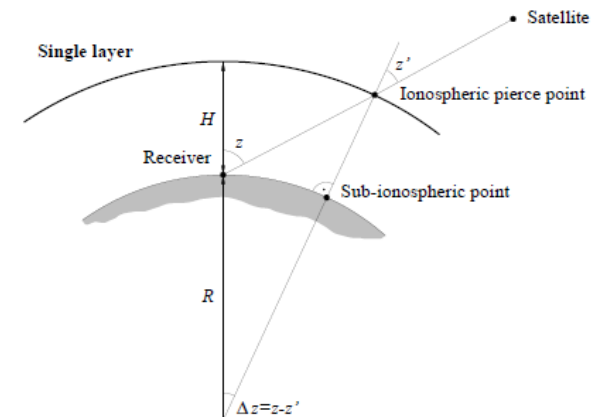
GNSS TEC maps



IGS / CODE GIMs



- ▣ Based on Single Layer Model
- ▣ Latitude/Longitude resolution of 2.5/5°
- ▣ Temporal resolution 2 hours
- ▣ Accuracy 2 to 8 TECU



External Ionospheric Files

```
# IONOSPHERIC DELAY
#
# This file was created on: 06.09.2012 (14:02:59)
#
# Session: 11APR04XA_N004
# IONEX-Map used: IGS
#
#
#
# X[m] Y[m] Z[m] geocLat(°) long(°) ellHeight[m]
# TSUKUB32 -3957409.3290 3310228.8070 3737494.6900 36.1031 140.0887 85.1
# WESTFORD 1492206.5410 -4458130.5150 4296015.5480 42.6129 288.5062 87.2
# BADARY -838200.7240 3865751.5880 4987670.9770 51.7703 102.2339 822.1
# NYALES20 1202462.7120 252734.4190 6237766.0730 78.9291 11.8697 87.8
# ZELENCHK 3451207.7810 3060375.2080 4391914.9190 43.7878 41.5652 1175.4
# WETTZELL 4075539.8360 931735.3120 4801629.4000 49.1450 12.8775 669.6
# ONSALA60 3370605.9840 711917.5280 5349830.7710 57.3958 11.9264 59.7
# HARTRAO 5085442.7760 2668263.5400 -2768696.9610 -25.8898 27.6854 1416.1
# TIGOCONC 1492051.3691 -4887961.4981 -3803541.7545 -36.8427 286.9748 171.3
# HOBART12 -3949990.7000 2522421.2000 -4311708.2000 -42.8056 147.4381 41.4
#
#
#
# TAI in YYYY.MM.DD-hh:mm:ss.s Azi(°) Elev(°) SurfAtmPres(mbars) SlantPathDel(sec)
o $11APR04XA_N004 1 2011.04.04-17:00:28.0 TSUKUB32 16.27155 8.27330 1021.8 2.2 5.53374062e-10
o $11APR04XA_N004 1 2011.04.04-17:00:28.0 WESTFORD 359.17439 74.14664 995.0 4.8 4.51483460e-10
o $11APR04XA_N004 1 2011.04.04-17:00:28.0 BADARY 356.74584 20.33693 921.2 -2.3 2.49916492e-10
o $11APR04XA_N004 1 2011.04.04-17:00:28.0 NYALES20 281.75293 57.91993 979.8 -7.4 3.20891316e-10
o $11APR04XA_N004 1 2011.04.04-17:00:28.0 ZELENCHK 327.72604 26.05855 881.3 5.5 6.99340300e-10
o $11APR04XA_N004 1 2011.04.04-17:00:28.0 WETTZELL 315.04493 42.50506 951.2 7.1 5.36879775e-10
o $11APR04XA_N004 1 2011.04.04-17:00:28.0 ONSALA60 308.39287 48.43337 1013.0 7.3 4.38730960e-10
o $11APR04XA_N004 2 2011.04.04-17:02:04.0 HARTRAO 171.22961 32.11184 864.2 16.3 5.19562375e-10
o $11APR04XA_N004 2 2011.04.04-17:02:04.0 TIGOCONC 174.35189 28.19209 1001.2 20.9 1.20527297e-09
o $11APR04XA_N004 2 2011.04.04-17:02:04.0 HOBART12 193.30796 45.29031 1023.6 10.2 1.14682664e-10
o $11APR04XA_N004 3 2011.04.04-17:04:36.0 TSUKUB32 246.59275 62.71321 1021.8 2.2 3.38962089e-10
o $11APR04XA_N004 3 2011.04.04-17:04:36.0 NYALES20 74.67426 19.56857 979.8 -7.5 4.88275810e-10
o $11APR04XA_N004 3 2011.04.04-17:04:36.0 ZELENCHK 85.53867 28.20331 881.3 5.2 6.12699355e-10
o $11APR04XA_N004 3 2011.04.04-17:04:36.0 WETTZELL 67.89038 10.22170 951.2 7.2 9.20086660e-10
o $11APR04XA_N004 3 2011.04.04-17:04:36.0 ONSALA60 68.72921 12.74627 1013.0 7.2 7.39657672e-10
o $11APR04XA_N004 4 2011.04.04-17:05:34.0 HARTRAO 226.57673 58.43939 864.3 16.2 4.20108024e-10
o $11APR04XA_N004 4 2011.04.04-17:05:34.0 TIGOCONC 120.90203 38.71486 1001.2 21.0 1.11345469e-09
o $11APR04XA_N004 5 2011.04.04-17:06:52.0 WETTZELL 206.17046 13.31171 951.3 7.1 1.23716051e-09
o $11APR04XA_N004 5 2011.04.04-17:06:52.0 ONSALA60 204.71077 6.10259 1013.0 7.3 1.27016728e-09
o $11APR04XA_N004 6 2011.04.04-17:08:18.0 TSUKUB32 91.44071 56.75754 1021.8 2.2 3.50684191e-10
o $11APR04XA_N004 6 2011.04.04-17:08:18.0 WESTFORD 303.91084 6.23446 994.9 4.8 9.52628086e-10
o $11APR04XA_N004 6 2011.04.04-17:08:18.0 BADARY 80.79770 30.29206 921.3 -2.4 2.84893022e-10
o $11APR04XA_N004 6 2011.04.04-17:08:18.0 NYALES20 12.02462 7.120 6237766.0730 78.9291 11.8697 87.8
```

Fragment from external ionospheric file

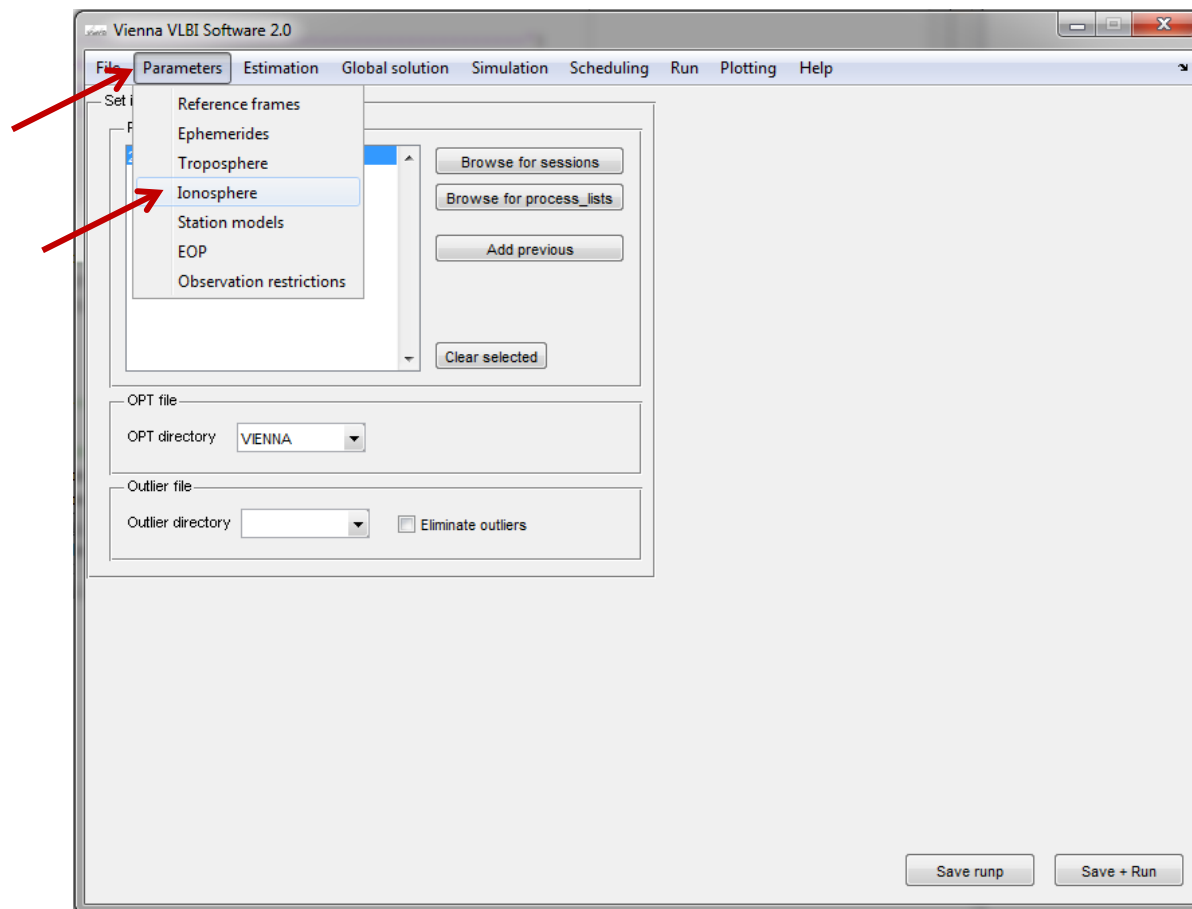
Example

1. Start VieVS

Process the session you want as usual

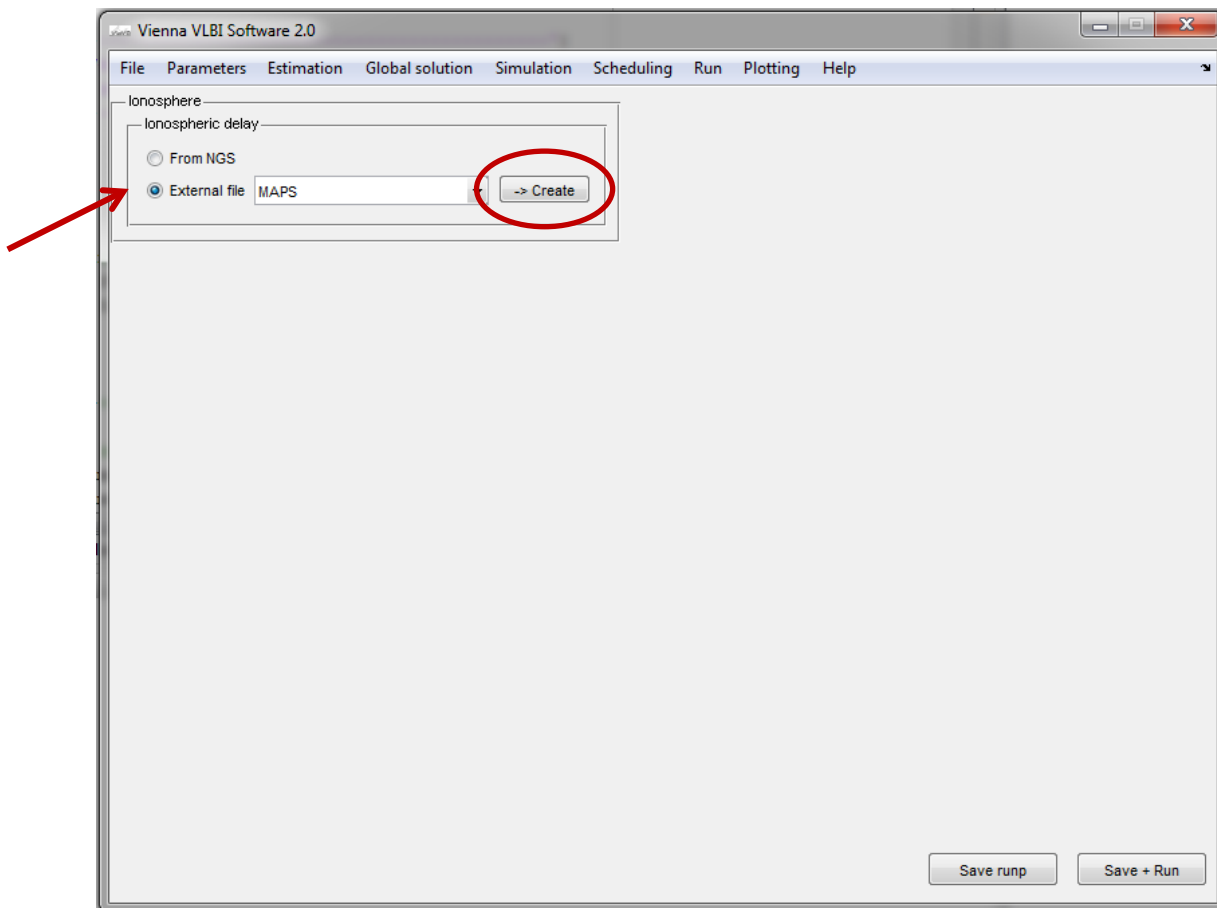
Example

2. Start program



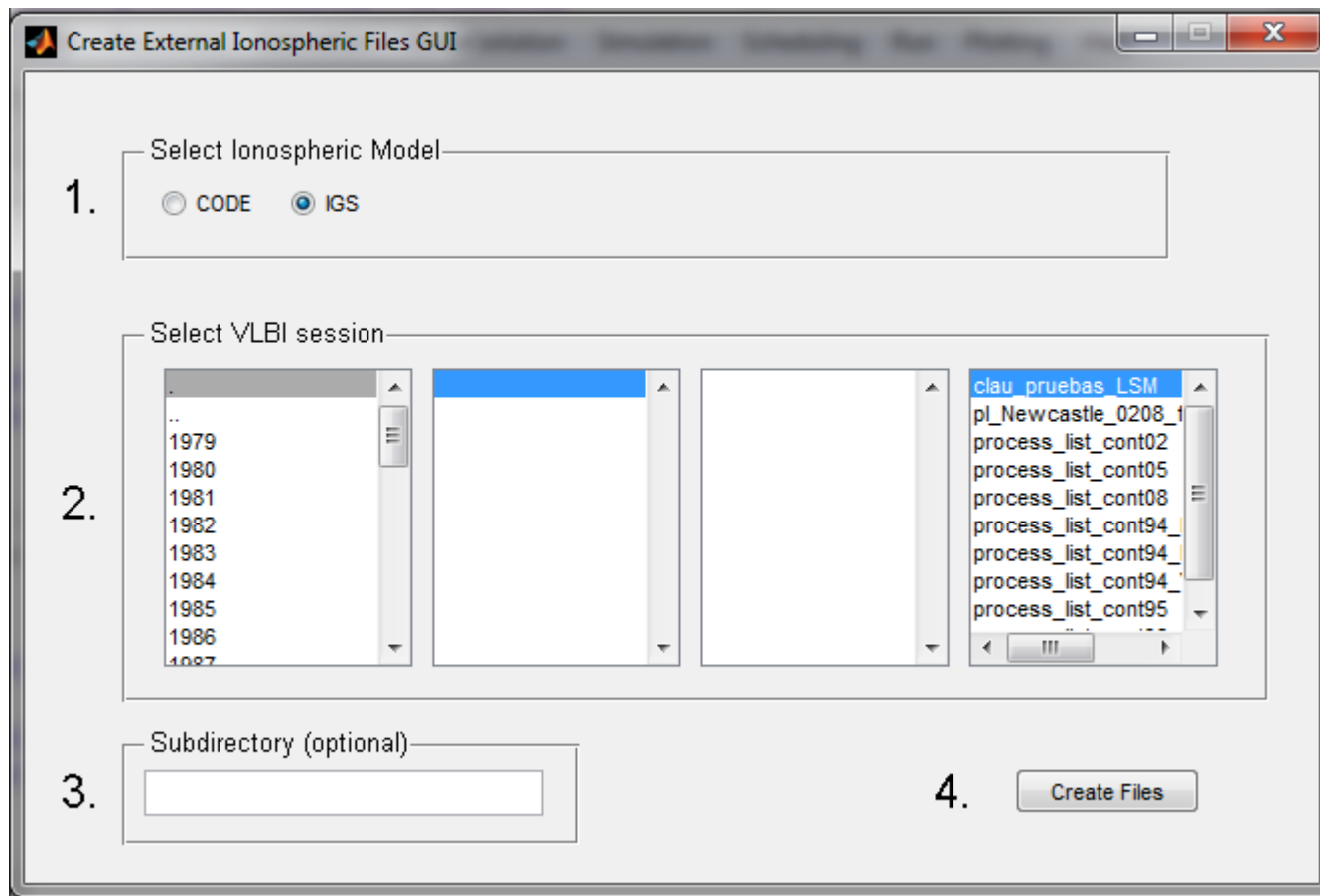
Example

2. Start program



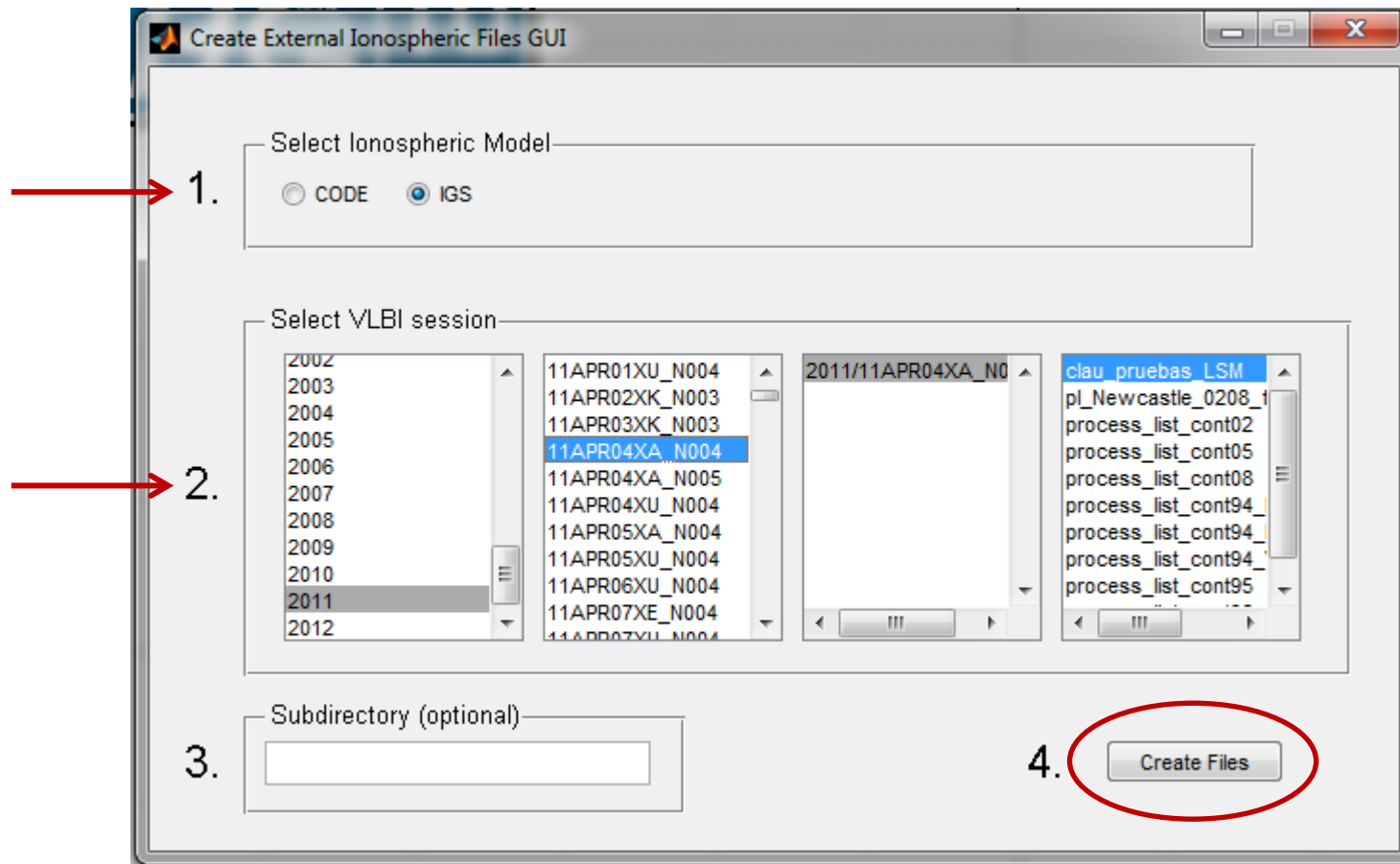
Example

2. Start program



Example

3. Select session and GIM



Example

```
IONO IGS file does not exist.
Zipped file ('igsg0940.11i.Z') was downloaded or already exists in
'..\..\MAPS\IGS\2011\'
Please extract manually (to same folder)!

===== LOG =====
|
0 file(s): successfully created

1 file(s): iono map does not exist (was downloaded - see above)
    2011/11APRO4XA_N004

===== END LOG =====

Elapsed time is 4.397475 seconds.
fx >>
```

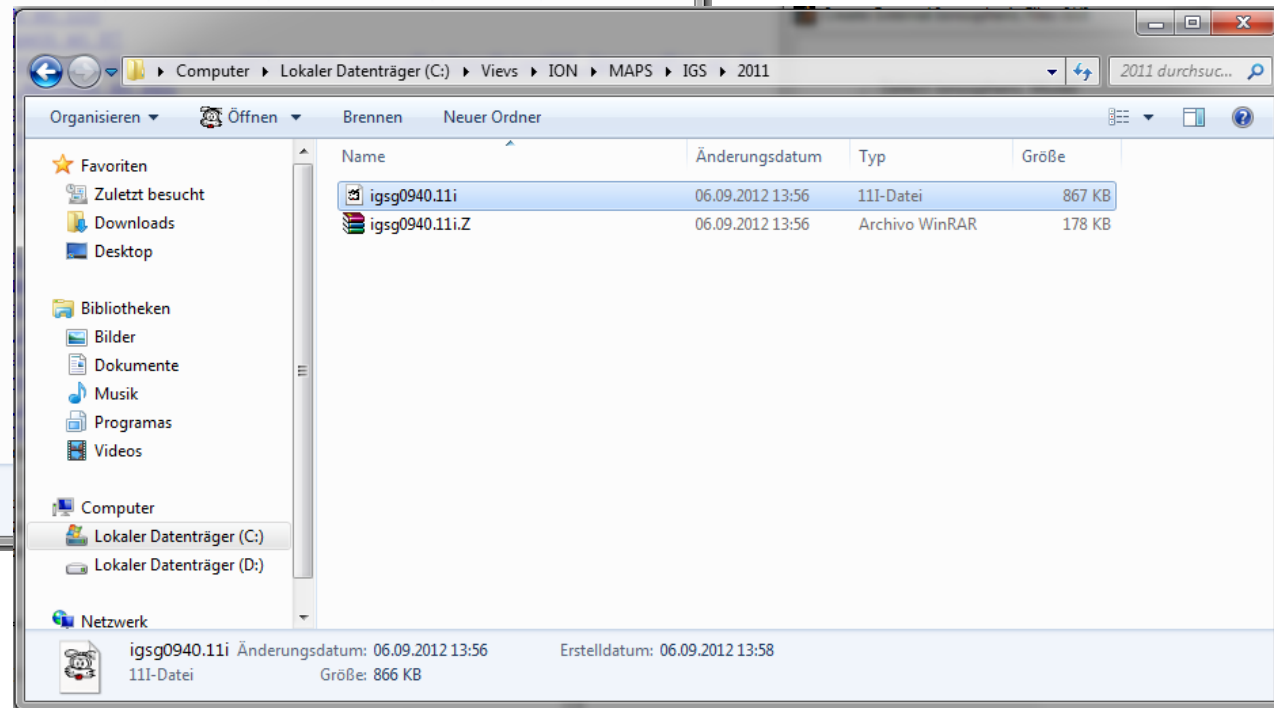
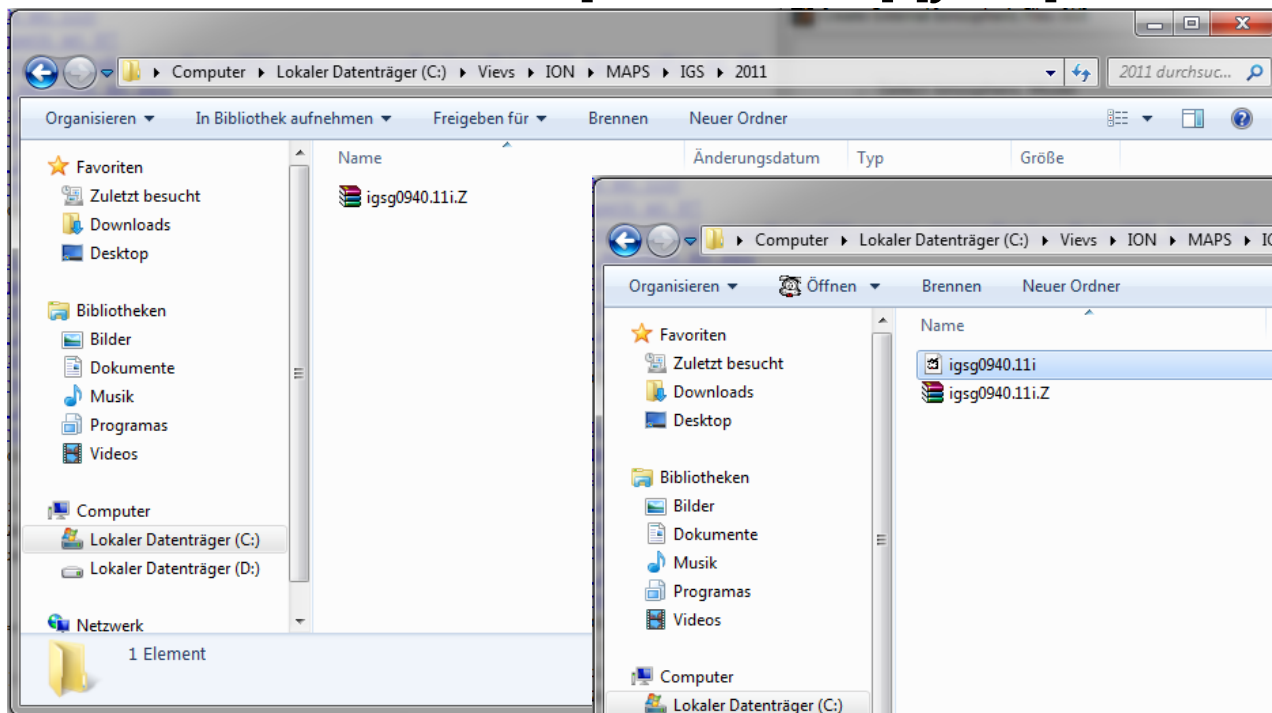
We obtain this message

The GIM has been downloaded from IGS/CODE server
...\Vievs\ION\MAPS\[IGS/CODE]\[year]

Example

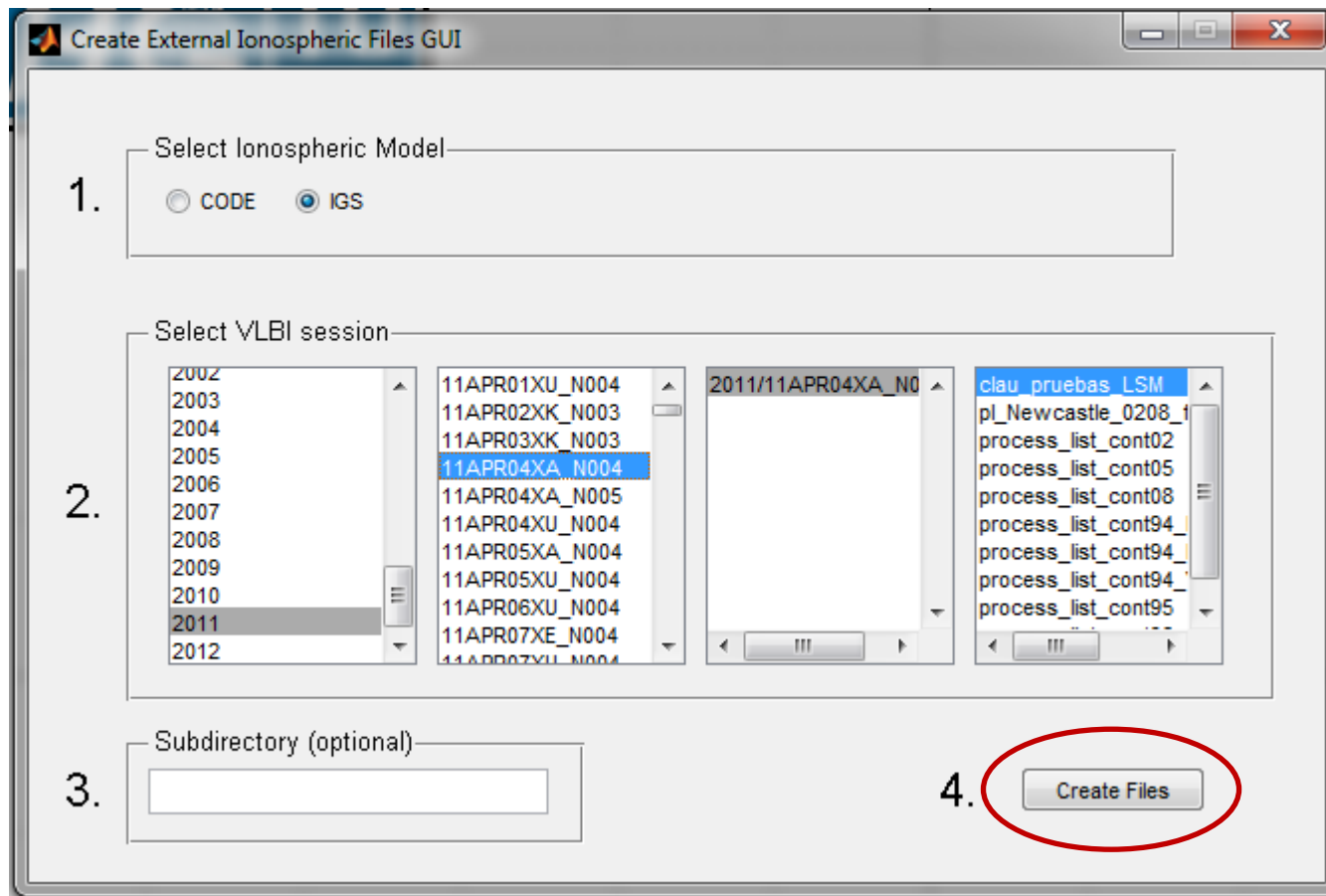
4. Unzip GIM

...\Vievs\ION\MAPS\[IGS/CODE]\[year]

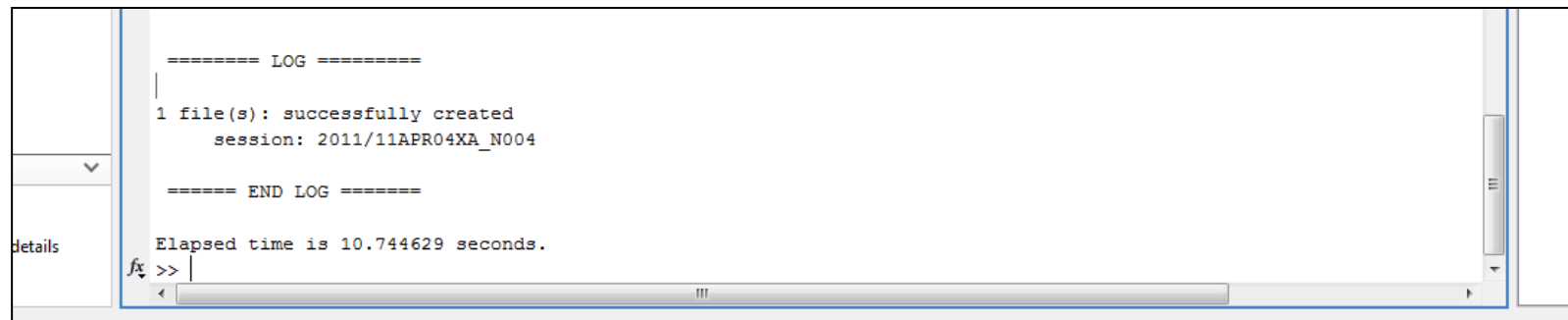


Example

5. Re-run program



Example



```
===== LOG =====  
1 file(s): successfully created  
   session: 2011/11APR04XA_N004  
===== END LOG =====  
  
Elapsed time is 10.744629 seconds.  
ft >> |  
< |
```

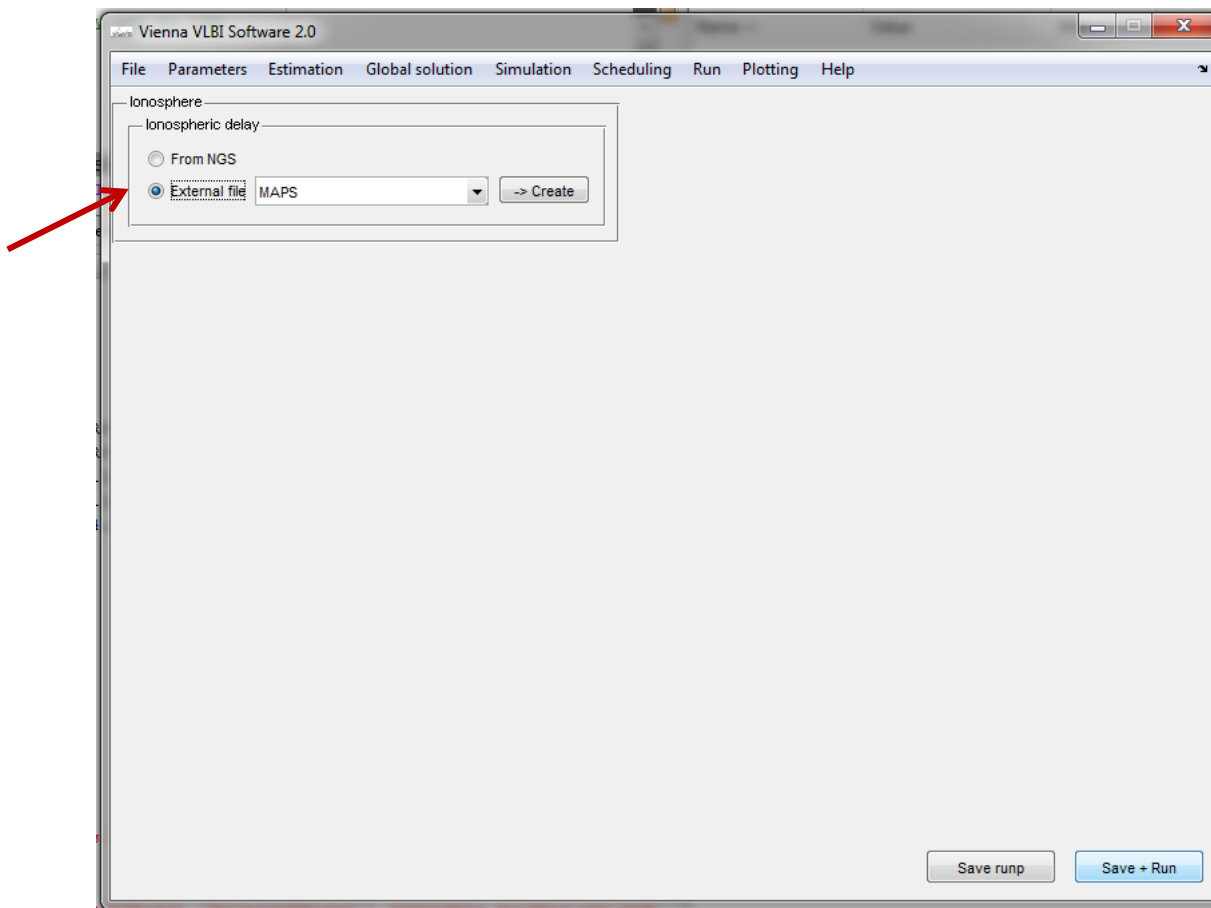
We obtain this message

The ionospheric File has been created!
...\Vievs\ION\[*directory chosen*]

If the VLBI observations took place in more than one day, a second map will be downloaded. Then, it is necessary to unzip it and re-run the program again

Example

6. Go back to VieVS window and select external file



Change work directory!

Example

8. Continue as usual