



Generation and Integration of local velocity tables into SeisComP3

Dr. Bernd Weber

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The easiest possibility to generate and integrate local velocity models is the use of TauP package.

The TauP Toolkit is a seismic travel time calculator. In addition to travel times, it can calculate derivative information such as ray paths through the earth, pierce and turning points. It handles many types of velocity models and can calculate times for virtually any seismic phase with a phase parser.



There are currently two variations of velocity model files that can be read.

The first format is that used by the most recent times codes (Kennett et al., 1995), .tvel. This format has two comment lines, followed by lines composed of depth, V_p , V_s and density, all separated by whitespace. TauP ignores the first two lines of this format and reads the remaining lines.

The second format is based on the format used by Xgbm, (Davis and Henson, 1993a; Davis and Henson, 1993b). It is referred to here as the .nd format for "named discontinuities." Its biggest advantage is that it can specify the location of the major boundaries and this makes it the preferred format. The file consists of two types of lines, those that specify velocity at a depth, and those that specify the name of a discontinuity.



A very simple named discontinuities model file might look like this:

```
/* below is a simple named discontinuities model. */
0000.0 05.0 3.0 02.7
0020.0 05.0 3.0 02.7
0020.0 06.5 3.7 02.9
0033.0 06.5 3.7 02.9
mantle
# the word "mantle" designates that this is the moho
0033.0 07.8 4.4 03.3
0410.0 08.9 4.7 03.5
0410.0 09.1 4.9 03.7
0670.0 10.2 5.5 04.0
0670.0 10.7 5.9 04.4
2891.0 13.7 7.2 05.6
outer-core
# "outer-core" designates that this is the core mantle boundary
2891.0 08.0 0.0 09.9
5149.5 10.3 0.0 12.2
inner-core
# "inner-core" makes this the inner-outer core boundary
5149.5 11.0 3.5 12.7
6371.0 11.3 3.7 13.0
```



TauP_Create takes a ASCII velocity model file, samples the model and saves the tau model to a binary file. The output file holds all information about the model and need only be computed once. It is used by all of the other tools. There are several parameters controlling the density of sampling. Their values can be set with properties. Check the TauP manual for the details.

Generate the tau model

```
sysop@host:~$ taup_create -nd <modelfile>
```



TauP_Table creates an ASCII table of arrival times for a range of depths and distances. Its main use is for generating travel time tables for earthquake location programs such as LOCSAT. The `-generic` flag generates a flat table with all arrivals at each depth and distance, one arrival per line. The `-locsats` flag generates a LOCSAT style travel time table with only the first arrival of all the phases listed at each distance and depth. Thus, the program must be run several times in order to generate files for several phases. Also, both options write to standard out unless a file is given with the `-o` flag.

Generate a phase table

```
sysop@host:~$ taup_table -mod <model> -ph <phase> --locsats -o <model.phase>
```



Copy files to table dir

```
sysop@host:~$ cp * <model>.* /seiscomp3/share/locsat/tables
```

Add table prefix to modules=>global=>LOCSAT=>profiles To force scautloc to use the new tables instead iasp91, change modules=>scautoloc=>locator=>profile to the new table prefix.