

Mach Wave analysis

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Open “refine_2017_55_C1.ipynb” and set the mainshock time, aftershock time, and mainshock hypocenter:

```
# Hypocenter information
origin_time_main = UTCDateTime("2017-07-17T23:34:56")      # get origin time of mainshock
origin_time_af   = UTCDateTime("2017-07-28T02:39:19")      # get origin time: AFTS-2 M6.1
lat0= 54.100
lon0= 169.800
dep0 = 20.1
```

Set the stations you want to analyze:

```
networklist="C1"
stationlist="AC01,AC04,AC05,AC06,AF01,AP01,AP02,AY02,AY03,BI02,BI04,BI05,B001,B002,B003,B004,C001,\
C002,C003,C004,C005,C006,LC01,LC09,LL01,LL02,LL03,LL04,LL05,LL06,LR03,LR04,LR05,MG01,MG02,MG03,\
MG04,MG05,ML02,MT01,MT02,MT03,MT04,MT05,MT07,MT08,MT09,MT10,MT12,MT13,TA01,TA02,VA02,VA03,VA04,\
VA05,VA06"
```

The waveforms are requested according to the lower time limit and the upper time limit, which are calculated by the minimum Rayleigh wave group velocity and maximum Rayleigh wave group velocity:

```
#travel time
Rayleith_arr = rdis*111.795 / 4.2 # assuming group velocity max is 4.5 km/s
Rayleith_end = rdis*111.795 / 3.1 # assuming group velocity max is 2.0 km/s

Rayleith_arr_main = origin_time_main + Rayleith_arr
Rayleith_end_main = origin_time_main + Rayleith_end
Rayleith_arr_af = origin_time_af + Rayleith_arr
Rayleith_end_af = origin_time_af + Rayleith_end
```

Filter the Rayleigh waves to the frequency band you want:

