Source mechanism solution

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1. A general introduction

The generalize cut and paste method (gCAP) (Zhu and Ben-Zion, 2013) for the full moment tensor inversion has been integrated in GeoTaos and GeoTaos_map. This manual provides a step-by-step guide for estimating moment tensor and source mechanism solutions using the gCAP method.

The gCAP method gives reasonable result for earthquakes of medium size with a magnitude from \sim 3 to \sim 6.

2. A step-by-step guide

Step-1: Prepare data files

Data file required for CAP are:

- 1) A seed file of all available wide band seismograms
- 2) An ASCII text file containing basic information of the target earthquake and P and S arrive times (if they are available).
- 3) A ASCII text file of 1D velocity model.

The seed file (???.seed) and the phase data file (for example, phase.txt) should be placed in a working folder such as "CAP_Sample".

It is better to put the velocity model file in separated fold such as "Vel_Models". It is convenient to name your velocity file with local or regional place name such as "Vel_Sichuan.vel". The title of the file would be used for sub folders for saving Green function of the model.

It is better to create two empty sub folders "SAC" and "SAC_RZT" under the working folder for later use. In the following example, the 1D velocity model is placed in the same working folder for demo convennice.

ΓΑΡΑ	ART1 (D:) > Temp4	√ Ū	Temp4の検索	م
^	名前	^		日付時刻
	SAC			2016/09/29 7:49
	SAC_RTZ			2016/09/29 7:49
	CQ.201001310536.0001.seed			2011/08/21 8:44
	🍓 GeoTaos.exe			2016/10/01 13:57
	🍓 GeoTaos_Map.exe			2016/09/29 7:49
	🍓 GreenFK.exe			2016/09/28 20:18
	phase.txt			2016/09/27 14:31
	Vel_CQPAL_RFI_Wang.vel			2014/02/18 9:57
Υ	<			>

File:

Phase.txt

time_zone=8.0 2010 01 31 05 36 57.40 30.28 105.71 5 4.8

										-
! 1D model	of PAL fr	om RFI by Wa	ng et al.	, 210)2					
! H V	p Vs	s Dens	ity Qp		Qs					
layers=21,	format=2	(thickness o	f each la	yer i	s giv	en)				
1.0000	3.9800	2.3000	2.4300	847	600	0.00	0.00	1.00	1.00	
1.0000	5.2000	3.0000	2.5000	847	600	0.00	0.00	1.00	1.00	
1.0000	5.4000	3.1200	2.6000	847	600	0.00	0.00	1.00	1.00	
1.0000	5.7445	3.2039	2.6489	847	600	0.00	0.00	1.00	1.00	
2.0000	5.9370	3.3116	2.6864	847	600	0.00	0.00	1.00	1.00	
2.0000	6.7431	3.7611	2.9132	847	600	0.00	0.00	1.00	1.00	
5.0000	7.8836	4.4050	3.2750	847	600	0.00	0.00	1.00	1.00	
10.0000	7.8227	4.3688	3.2549	847	600	0.00	0.00	1.00	1.00	
10.0000	7.8672	4.3978	3.2681	847	600	0.00	0.00	1.00	1.00	
0.0000	7.4391	4.1524	3.1263	116	76	0.00	0.00	1.00	1.00	

File: Vel_CQPAL_RFI_Wang.vel

Step-2: Start GeoTaos or GeoTaos_Map

Start GeoTaos or GeoTaos_Map.

In the case of GeoTaos Click [File]->[New]

New		×
New Coulomb stress		ОК
KongXi Formation	^	Cancel
KongXiTao	× .	

Highlight "Coulomb stress"

Click <OK>

Tag to "Gmaps" working sheets, sellect "3: Earth Model" in row-0. All works could be carried out in following work sheet.

8 0	GeoTaos - GeoTaos	:Tough+: new	- 🗆 X
10	is s is is	地 🖪 🛃 💌 😂 🌌 🛄	⊀▶>\│≠≠≓≡∅≠ä?。
EFile	Edit Graph	TPSpro Window Help	
	×		
Ĩ=	Farth Model		
	1	3:Earth Model	Add/Clear Gmap files(MIF;DLG;XYZ;MSH)
1	Earth::4LAYE	RS: A typical 4-Layer model	
2	Model	0: EHS-Elastic Half Space 🔹	Select earth model
3	Do	0: Load[type=1]	Load, Save, Select Buildin model
4	Do	0: Draw model[type=1]	Draw model; Draw Trvel time; Tp vs Ts=p; Vp/Vs hist.
5	Green functio	n of 4LAYERS: A typical 4-Layer model	
6	Hs,km	=2, 10, +=2	Source depth in km
7	R,km	=100, 200, += 5	Station distance in km
8	dT, N	.06 2048.	Sampling interval in sec, Number of samples
9	sigma, taper	23	sigma(23), taper(0-1: lowpass filter :
10	f1, f2	0 0	Hz, f1 < f2, High-pass filter
11	dk, kmx	.3 15.	dk(0.1–0.4), kmx(10–30), wavenumber
12	Run	0: F-K(DC)(1Hs, 1R)	Create Green functions
13	//GrnLib	Not defined!	Folder of green function files
14	Calculate syn	thetic seismograms	E E
15	Strike, Mw	35. 4.5	Strike, Mw of the earthquake
16	dip, Rake	90. 0	Dip and Rake of the fault
17	Run.	0: Trapezoid [type=1]	Sources function
18	Dura., Rise	15	Parameters defined the source time function
19	Run.	0: Az=0,355,+=5 (dis.)	Create displacment or velocity seismograms
20	Mechanism so	lution by CAP+alfa	
21	DO	0: Specify folder for SACs	· Specify folder of SAC files 용
22	//SAC folder	Not defined!	Folder of SAC files
23	DO	0: Verify Lib of Green funcion	· Verify/create green function files ගු
24	nS, nG_x	0 0	nS: Number of stations, nG,x: number of Green function
25	Run.	0: Create input file	Do mechanism solution.
26	Do	0: Radiaton vs Az [type=1]	Show results.
27	3D plot	0: P(Sphere)	SD options.
28	3D opt	0: none +	SD options.
29	Show	0 1.	Range of rms for plot
30	H, km	0 20.	Range of depth plot
31			
32			
1	Map Gmaps	Coulomb Fault DEM/Surface Load Injection	
CLE	B_IN CLB_OUT	CLB_FUN Reservoir	
Ready	1		

"Earth model" working sheet in GeoTaos.

You can also use GeoTaos_map

In the case of GeoTaos_Map

Click [File]->[Empty World] Tag to "Layer", Highlight "Earth Model"



"Earth model" layer in GeoTaos_Map.

You will find the working sheet in GeoTaos and GeoTaos_Map are uniform.

Step-3: Convert seed file to SAC files

3-1 Specify SAC folder

12	Run.	0: F-K(DC)(1Hs, 1R)	-	Create Green functions
13	//GrnLib	Not defined!		Folder of green function files
14	Calculate syn	thetic seismograms		
15	Strike, Mw	35. 4.5		Strike, Mw of the earthquake
16	dip, Rake	90. 0		Dip and Rake of the fault
17	Run.	0: Trapezoid [type=1]	-	Sources function
18	Dura., Rise	15		Parameters defined the source time function
19	Run.	0: Az=0,355,+=5 (dis.)	-	Create displacment or velocity seismograms
20	Mechanism so	lution by CAP+alfa		
21	DO	0: Specify folder for SACs	-	Specify folder of SAC files
22	//SAC folder	Not defined!		Folder of SAC files
23	DO	0: Verify Lib of Green funcion	-	Verify/create green function files
24	nS, nG_x	0 0		nS: Number of stations, nG,x: number of Gree
25	Run.	0: Create input file	-	Do mechanism solution.
26	Do	0: Radiaton vs Az [type=1]	•	Show results.
27	3D plot	0: P(Sphere)	-	SD options.
28	3D opt	0: none +	•	SD options.
29	Show	0 1.		Range of rms for plot
30	H, km	0 20.		Range of depth plot
31				
32				
	Map Gmaps /	Coulomb Fault DEM/Surface Load Injection /		



Be sure row-22 shows the full path name of the folder you specified.

21	DO	0: Specify folder for SACs	-	Sp
22	//SAC folder	D:¥CAP_Sample¥SAC/		Fo
23	DO	0: Verify Lib of Green funcion	-	Ve
24	nS, nG_x	0 0		nS
25	Run	0 [.] Create input file	-	Do

Add the seed file

8	dT, N	.08	2048.		Sai		li					
9	signa, taper	2	3		sig		2		Select a seed file.			×
10	f1, f2	0	0		Hz,					_		
11	dk, kmx	3	15.		dK		ファイルの場所(D	CAP_Sample		*	- 🗈 📸 -	
12	Run.		0: F-K(DC)(1Hs, 1R)	-	Cn	H	œ.	名前	<u>^</u>		更新日時	種類
13	//GrnLlb	Not a	defined!		Fol			CAP			2016/09/30 8:10	ファイル フォルダ
14	Calculate syn	theti	c seismograms				地位表示した場所	🕌 GreenFun	dt0080ms		2016/09/29 14:11	ファイル フォルダ
15	Strike, Mw	35.	4.5		Str			SAC			2016/09/28 15:48	ファイル フォルダ
16	dip, Rake	90.	0		Dip		デスクトップ	SAC_RTZ			2016/09/28 15:56	ファイル フォルダ
17	Run.		0: Trapezoid [type=1]	-	Sor		110	CQ.20100	1310536.0001.seed		2011/08/21 8:44	SEED 77-11
18	Dura., Rise	1.	5		Pa				種類: SEED ファイル	1		
19	Run.		0: Az=0,355,+=5 (dis.)	•	Cre		21729		サイズ: 11.0 MB			
20	Mechanism so	lutio	n by CAP+alfa						更新日時: 2011/08/21 8:44			
21	DO.,		1: Add Seed file	-	Spi		PC					
22	//SAC folder	D:VC	AP_SampleVSAC/		Fol		C.					
23	DO.		0: Verify Lib of Green funcion	٠	Ve							
24	nS, nG, x	0	0		nS:		ネットワーク	<				>
25	Run.		0: Create input file	*	Do			7-11-200	00 201001210526 0001 and			RBC(O)
26	Do		0: Radiaton vs Az [type=1]	٠	Sh			J PT JARRAN	0.00.201001010300.00013eed			he here
27	3D plot		0: P(Sphere)	•	SD			ファイルの種類(T):	(*seed)		·	キャンセル
28	3D opt		0: none +	٠	SD	11						
29	Show	0	1.		Ra	11						
30	H, km	0	20.		Ra	11						
31						11						
90						н						

You can explore the SAC folder to check the SAC files created.

1 🔒 🔒 📼 1		SAC					× 1
パル ホーム 共有 表示							10
E- Monta X uomo ₩2/Ckock- 2 se-horedMonta	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	第日の 第日の 2月の 2月の 2月の 2月の 2月の 1月の 1月の 1月の 1月の 1月の 1月の 1月の 1月の 1月の 1	1015年 2 単元	日本へて道沢 18 道沢和時 日 道沢の切り替え			
クリップボード	要理	新規	MRC .	現代			
-) 🕘 + 🕆 📕 + PC + SSD-PE	U3 (D:) + CAP_Sample + SAC				× 6	SACの検索	p
★ お気に入り	□ 名前			更新日時	12:51	サイズ	
😌 Dropbox	2010 01 31	05 36 57400 d0084 a012	SCXCO BHE.sac	2016/09/28	15:45 SAC 27-6	253 KB	
1 40×0-F	2010_01_31	05_36_57400_d0084_a012	SCXCO_BHN.sac	2016/09/28	15:45 SAC 274.0	253 KB	
Te1077	2010 01 31	05 36 57400 d0084 a012	SCXCO_BHZ.sac	2016/09/28	15:45 SAC 274%	253 KB	
12. 最近表示した場所	2010_01_31	05_36_57400_d0103_a194	COROC_BHE.sac	2016/09/28	15:45 SAC 7747	253 KB	
	2010_01_31	05_36_57400_d0103_a194	CQROC_BHN.sac	2016/09/28	15:45 SAC 77-6%	253 KB	
🖏 ホームヴループ	2010_01_31	05_36_57400_d0103_a194	_CQROC_BHZ.sac	2016/09/28	15:45 SAC 77476	253 KB	
	2010_01_31	05_36_57400_d0109_a001	SCHYS_BHE.sec	2016/09/28	15:45 SAC 7/-14	253 KB	
PC .	2010_01_31	05_36_57400_d0109_a001	_SCHYS_BHN.sec	2016/09/28	15:45 SAC 7:4%	253 KB	
The (eve-pc)	2010_01_31	05_36_57400_d0109_a081	_SCHYS_BHZ.sac	2016/09/28	15:45 SAC 77-1%	253 KB	
🎉 ダウンロード	2010_01_31	05_36_57400_d0117_a113	CQYUB_BHE.sac	2016/09/28	15:45 SAC 77-114	253 KB	
🎽 デスクトップ	2010_01_31	05_36_57400_d0117_a113	_CQYUB_BHN.sac	2016/09/28	15:45 SAC 77414	253 KB	
F#1X2F	2010_01_31	05_36_57400_d0117_n113	_CQYUB_BHZ.sac	2016/09/28	15:45 SAC 774.6	253 KB	
JE 10997	2010_01_31	05_36_57400_d0126_a138	_CQCQT_BHE.sac	2016/09/28	15:45 SAC 774/4	253 KB	
■ ビデオ	2010_01_31	05_36_57400_d0126_n138	CQCQT_BHN.sac	2016/09/28	15:45 SAC 774/6	253 KB	
1 E1-547	2010_01_31	05_36_57400_d0126_a138	_CQCQT_BHZ.sac	2016/09/28	15:45 SAC 771/4	253 KB	
L Windows (C:)	2010_01_31	05_36_57400_d0148_a238	SCHMS_BHE.sac	2016/09/28	15:45 SAC 27-6%	253 KB	
in SSD-PEU3 (D:)	2010_01_31	05_36_57400_d0148_a238	SCHMS_BHN.sac	2016/09/28	15:45 SAC 77416	253 KB	
SSD-PEU3 (E:)	2010_01_31	05_36_57400_d0148_a238	_SCHMS_BHZ.sac	2016/09/28	15:45 SAC 77476	253 KB	
👷 Lei (WILEI_TS110126) (S:)	2010_01_31	05_36_57400_d0152_a105	_CQCHS_BHE.sac	2016/09/28	15:45 SAC 27472	253 KB	
😪 Lei (WLEI_T5130126) (T:)	2010_01_31_	05_36_57400_d0152_a105	_CQCHS_BHN.sac	2016/09/28	15:45 SAC 77435	253 KB	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2010_01_31_	05_36_57400_d0152_a105	_CQCHS_BHZ.sac	2016/09/28	15:45 SAC 7/476	253 KB	
キットワーク	2010_01_31	05_36_57400_d0177_a109	_CQFUL_BHE.sac	2016/09/28	15:45 SAC 77-15	253 KB	
	2010 01 21	AR AJ ATLAS (8197 -100	CONTRACT READING	2010/01/2011	15.15 010 7-21	15,0115 1,105	

Step-4: Rotate, resample, and save the rescaled seismograms to a new folder

4-1 Load SAC files. Select 2: Load SAC files and click <DO..> in row-21.

20	Mechanism so	lution by CAP+alfa		
21	DO	2: Load SAC files	-	S¢
22	//SAC folder	D:¥CAP_Sample¥SAC/		Fc
23	DΟ	O: Verify Lib of Green funcion	-	Ve

4-2 Rote NEZ record to RTZ record.

"Select 4: Rotate NE to RT" and click <DO..> in row-21.

4-3 Resampling

Check the sampling interval is that you want in row-8. The default is 0.08 second.

6	Hs,km	=2, 10, +=2		So
7	R,km	=100, 200, += 5		Sta
8	dT, N	.08	2048.	Sai
9	sigma, taper	2.	.3	sig
10	f1, f2	0	0	Hz,

Select "5: Resampling" and click <DO .. > in row-21

4-4 Save SAC files, which are ready for CAP inversion, to a new folder.

Select "6: Save to a new folder", and then click <DO..> in row-21.

0	oigina, capoi	2		2 「」 「」 「」 「」 「」 「」 「」 「」 「」 「」 「」 「」 「」	
10	f1, f2	0 0		Hz, 22	
11	dk, kmx	.3 15.		フォルダーの参昭	
12	Run.	0: F-K(DC)(1Hs, 1R)	-		J3
13	//GrnLib	Not defined!		Select folder for saving Rotated SAC files.	-
14	Calculate syn	thetic seismograms			
15	Strike, Mw	35. 4.5		🔺 📻 SSD-PEU3 (D:)	
16	dip, Rake	90. 0		AE_Ohuchi	
17	Run.	0: Trapezoid [type=1]	•	D APP	
18	Dura., Rise	15		D 🖟 CAP_BENCHMARK	
19	Run	0: Az=0,355,+=5 (dis.)	-	🔺 🍌 CAP_Sample	
20	Mechanism so	lution by CAP+alfa		D 🍌 CAP	
21	DO	6: Save to a new folder	•	🖟 GreenFun_dt0080ms	
22	//SAC folder	D:¥CAP_Sample¥SAC/		SAC SAC	
23	DO	0: Verify Lib of Green funcion	-	SAC_RTZ	
24	nS, nG_x	0 0		DATA	
25	Run.	0: Create input file	*	🛛 🔋 🕌 FUL	
26	Do	0: Radiaton vs Az [type=1]	-	▷ iii GeoTaos_1	
27	3D plot	0: P(Sphere)	-		
28	3D opt	0: none +	•	OK キャンヤル	
29	Show	0 1.			
30	H, km	0 20.			
31				Windows (C:)	

Be sure the SAC folder in row-22 has changed to the new one.

21	DO	2. Ludu SAO mes	•	ope
22	//SAC folder	D:¥CAP_Sample¥SAC_RTZ/		Fol
23	DO	0: Verify Lib of Green funcion	-	Ve

You can explore the SAC_RTZ folder to check the rotated and rescaled SAC files.

1 🔾 🕕 🗧	SAC_RTZ				
77イル ホーム 共有 表示				: A	
● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●			すべて選択 選択相除 選択の切り替え 選択		
🐑 🕘 🍷 🕆 📕 + PC + SSD-PEU3 (C	:) + CAP_Sample + SAC_RTZ		V & SAC.	RTZの検索 」	
🔆 お気に入り	□ 名前 *	更新日時	燈湖	サイズ	
Dropbox	20100131_053657400_CQCHS_R.sac	2016/09/28 15:56	SAC 7711V	17 K	
🎉 ダウンロード	20100131_053657400_CQCHS_T.sac	2016/09/28 15:56	SAC 77114	17 K	
= テスクトップ	20100131_053657400_CQCHS_Z.sac	2016/09/28 15:56	SAC 77-11	17.K	
1 最近表示した場所	20100131_053657400_CQCQT_R.soc	2016/09/28 15:56	SAC 77-11	17 K	
	20100131_053657400_CQCQT_T.sac	2016/09/28 15:56	SAC 77-114	17 K	
ホームグループ	20100131_053657400_CQCQT_Z.sac	2016/09/28 15:56 SAC 774/J		17 K	
	20100131_053657400_CQFUL_R.sac	2016/09/28 15:56	SAC 77114	17 K	
PC PC	20100131_053657400_CQFUL_T.sac	2016/09/28 15:56	SAC 77-114	17 K	
P Lin (eve-pc)	20100131_053657400_CQFUL_Z.sac	2016/09/28 15:56	SAC 77-112	17 K	
🎽 ダウンロード	20100131_053657400_CQQIJ_R.sac	2016/09/28 15:56	SAC 77414	17 K	
▶ デスクトップ	20100131_053657400_CQQU_T.sac	2016/09/28 15:56	SAC 77-114	17 K	
1 F#2301-	20100131_053657400_CQQU_Z.sac	2016/09/28 15:56	SAC 77-11	17 K	
1 ピクチャ	20100131_053657400_CQROC_R.sac	2016/09/28 15:56	SAC 77-11	17 K	
H 177	20100131_053657400_CQROC_T.sac	2016/09/28 15:56	SAC 77-114	17 K	
1 22-597	20100131_053657400_CQROC_Z.sac	2016/09/28 15:56	SAC 77-11	17 K	
Windows (C:)	20100131_053657400_CQSHZ_R.sac	2016/09/28 15:56	SAC 77114	17 K	
SSD-PEU3 (D:)	20100131_053657400_CQSHZ_T.sac	2016/09/28 15:56	SAC 77-114	17 K	
SSD-PEU3 (E:)	20100131_053657400_CQSHZ_Z.soc	2016/09/28 15:56	SAC 77-112	17 K	
😿 Lei (¥¥LEI_TS110126) (S:)	20100131_053657400_CQWAS_R.sac	2016/09/28 15:56	SAC 77-114	17 K	
	20100131_053657400_CQWAS_T.sac	2016/09/28 15:56	SAC 77-11	17 K	
	20100131_053657400_CQWAS_Z.sac	2016/09/28 15:56	SAC 77412	17 K	
📭 ネットワーク	20100131_053657400_CQWAZ_R.sac	2016/09/28 15:56	SAC J711	17 K	

Step-4: Specify the 1D velocity model, determine depth range and other parameters

Select "0: Load" and then click <Do..> in row-3. Specify the velocity file in the file dialogue box appeared.

ы.	1-0			.8		Load from velocity m	odel fil	e	×
~	128 08 108 108 ×	- 11 14 49 15 15 19 77 😹 🛄	151 + 1	ファイルの場所の	GAP,Senple		•	+ 🗈 🗗 🗊 -	
	Earth Model			Ca.	名相	1		更新日時	理調
	1	3 Earth Model	• A0	BIGER NAM	L CAP			2016/09/30 8:10	77416 78163-
1	Earth: 4LAYE	RS: A typical 4-Layer model		MOCLECT-CACHEVIT	🗼 GreenFun	_dt0080ms		2016/09/29 14:11	77-11. 781.19-
2	Model	0. EHS-Elastic Half Space	+ Sel		A SAC			2016/09/28 15:48	ファイル フォルダ・
3		0 Load(type=1)	+ Los	デスクトップ	SAC_RTZ			2016/09/28 15:56	ファイル フォルダ
4	Do.	O Draw model(type=t)	-1 pr	144	Vel_COPA	L_RFI_Wang.vel		2014/02/18 9:57	VEL 77-1%
5	Green functio	on of 4LAYERS: A typical 4-Layer n	odel						
6	Hts.km	12,10,112	So	51/51					
7	R,km	=100, 200, += 5	Sta	1.					
8	dT, N	.08 2048.	Sa	PO					
9	signa, taper	2 3	110	6					
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13	//GmLib	Not defined	Fol		7-11.0551070	Rewell			New Area
14	Calculate syn	thetic seismograms		NAT NONTRACIA IL NO				44704	

You will see a profile plot showing Vs, Vp, and other data against depth.



Step-5: Load and show the rescaled seismograms

If you use GeoTaos_Map, you can load the new rotated and resampled SAC files and show waveforms.

Step-6: Verify green functions

In row-6, type a range of focal depth. Say, "=2, 10, +=0.5", means 2, 2.5, 3.5,..10 km.

Select "0: Verify Lib of Green function" and click <DO..> in row-23.

Two text files will be created. One is "sac_list.txt" containing a list of stations with some information. Another is "Grn_tobemade_list.txt" containing a list of distance for which new Green function should be made.



Step-8: Make/add green functions

Select "3: Add grnfuns (DC & ISO)" and click <DO..> in row-23.

A number of "Green_FK" will be started automatically. The number is equal to the number of focal depth been specified in row-6. For example, "2, 10, +=0.5" corresponds to 17 depths. It may take tens of minutes to tens of hours to complete all calculation. Then you can see several thousand sac files in the sub folder "GreenFun_dt0080ms", here 80ms is the sampling interval given in row-8. Keep in mind the resampled seismograms have the same sampling interval.

1 🕞 👪 = 1	G	reenFun_dt0080ms			- 1	×
ファイル ホーム 共有 表示						^ 😮
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6000-F	grn_hs00200	hr00000_x01030_0.sac	2016/09/28 17:15	SAC 77-11	9 KB	
= = = 7/h="	grn_hs00200	hr00000_x01030_1.sac	2016/09/28 17:15	SAC ファイル	9 KB	
(1) 最近表示(小規則)	gm_hs00200	hr00000_x01030_2.sac	2016/09/28 17:15	SAC 77-11-	9 KB	
EN MALENTON BUT	gm_hs00200	hr00000_x01030_3.sac	2016/09/28 17:15	SAC ファイル	9 KB	
→ ホールヴループ	gm_hs00200	hr00000_x01030_4.sac	2016/09/28 17:15	SAC 7711	9 KB	
	grn_hs00200	hr00000_x01030_5.sac	2016/09/28 17:15	SAC ファイル	9 KB	
PC	gm_hs00200	hr00000_x01030_6.sac	2016/09/28 17:15	SAC 7711	9 KB	
P Lin (eve-pc)	grn_hs00200	hr00000_x01030_7.sac	2016/09/28 17:15	SAC 77-11/	9 KB	
1 4000-F	grn_hs00200	hr00000_x01030_8.sac	2016/09/28 17:15	SAC 7711	9 KB	
■ デスクトップ	gm_hs00200	hr00000_x01030_a.sac	2016/09/28 17:15	SAC 7711	9 KB	
F#102h	gm_hs00200	hr00000_x01030_b.sac	2016/09/28 17:15	SAC ファイル	9 KB	
E 2070	gm_hs00200	hr00000_x01030_c.sac	2016/09/28 17:15	SAC 27-11/	9 KB	
B PTZ	grn_hs00200	hr00000_x01090_0.sac	2016/09/28 17:15	SAC 77474	9 KB	
Ea-Se0	grn_hs00200	hr00000_x01090_1.sac	2016/09/28 17:15	SAC 77412	9 KB	
1. Windows (C-) 3,094 個の項目	 qrn_hs00200 	hr00000_x01090_2.sac	2016/09/28 17:15	SAC ファイル	9 KB	
-		11 1	1		1	F

If you verify green function again, you will see an empty list in "Grn_tobemade_list.txt". So far, it is ready to carry out CAP inversion.

Step-9: Carry out CAP inversion for a single depth or a range of depth

With following to steps, you can make CAP inversion for the first depth specified in row-6.

Select "0: Create input file" and click <OK> in row-25.

Select "1: CAP (grid search)" and click <OK> in row-25.

Step-10: Plot CAP results for a single depth or a range of depth

Select "2: CAP for all depth" and click <OK> in row-25.

- A number of "Green_FK" will be started automatically. This time, the Green_FK will complete CAP inversion. It may take tens of minutes to a few hours.
- When the inversion for all depth is finished. Explore the "CAP" sub folder. You will see a lot of files and sub folders.

Step-11: Show CAP results

Select "2: Show CAP results" and click <OK> in row-26. Specify and "CAP_out_???.txt" of the depth you chosed.



You will see a 3D radiation ball in the 3D openGL view.



And CAP results in the "X-Ys graph" view.



Event: 20100131_033657400, Model: Vel_CQPAL_RET_Wing, Depth-4.0 PMI_04974FMZ_204421109, Mo-4.47, mm_4141e-003-49867; EBR ellipsoid 0.0.1, ISO-4.00.0.00, CLVD 0.14.0.00, Gdc=0.98, Giso=0.00, Gclvd=0.02 Variance reduction = 4.0.8 MomentTensor = 6.466e=022(dpn=*cm)_0.142_0.252_0.134+1.019-0.110_0.869 PotencyTensor ISO = -0.00_109_2_2.315e+014.m.3



Select "3: Show CAP results (Missfit vs Hs)" and click <OK> in row-26. Specify any "CAP_out_???.txt".

You may need to change ranges for rms and depth in row-29 and row 30 to get a well arranged plot.



A. 地知道点滴

对于4级以上地震,用0.16秒的采样频率就足够了,这样连格林函数计算一起也用不了半个小时就可获得结果!

磨溪地震,发现存在两个极值中心,残差几乎一样,一为正断层,一为逆断层,这种条件下只能根据 构造约束取逆断层了。

P波初动是强力约束,对明确的初动方向应该尽量利用。由于波的周期性,位错180度时仍然有较高的相关系数,但这时极性相反。当几个震相的振幅不能相互制约时,很有可能在+-Rake处出现两个极值,这时有一个P波初动方向便可约束解的不确定空间了。