- 1 Stability of the regional stress field in central Japan during the late Quaternary
- 2 inferred from the stress inversion of the active fault data
- 3
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7 ABSTRACT

8 We analyzed 169 geological fault-slip data from 37 active faults in central Japan to 9 investigate the late Quaternary stress field stability. Modern stress states have been 10 documented with unprecedented accuracy; however, their stability over time scales 11 beyond instrumental observations is inadequately understood. Because the stress field 12has changed in the geological past, we compared present stress conditions in central 13 Japan, determined from geophysical observations, with conditions determined by 14inverting the fault-slip data from active faults that exhibited cumulative displacement for the past $\sim 10^5$ years. The maximum stress axis obtained from fault-slip data trends 1516ESE-WNW. This state of stress accounts for 97% of the data and supports the fact that 17oblique faults with reverse and strike-slip senses are interlaced in the region. The 18 optimal stress is similar to the present stress state, indicating that the stress field in central Japan has been uniform and stable over the past $\sim 10^5$ years. 19

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21 **1. Introduction**

22The crustal stress field is one of the most important parameters required to 23understand tectonics, but the secular variation or stability of tectonic stress is not adequately understood for the time scales of $10^3 - 10^5$ years. The World Stress Map 2425(WSM) Project was the first coordinated effort to map tectonic stress fields worldwide 26[Zoback, 1992], and the WSM database released in 2008 [Heidbach et al., 2010] 27contains three times as much stress data as that of the 1992 database. Most of the data 28sets used to derive the stress fields in the project are geophysical data such as those 29derived from the focal-mechanism solutions of earthquakes and wellbore breakout. In 30 contrast, geological data such as fault-slip data and volcanic-vent alignment accounted

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31 for only ~10% of the total data [Zoback, 1992; Heidbach et al., 2010]. The geophysical data reveal stress fields on the time scales of 10^{0} – 10^{2} years, whereas the geological data 32reveal stress fields over longer periods, usually 10^5 years or longer. Active faults are the 33 34clues that will help in filling the gap between the time scales of geophysical and 35 geological observations because their intermittent but steadily growing displacements over the last $10^3 - 10^5$ years are evident from, e.g., geomorphology, paleoseismic 36 37 trenching, and seismic-reflection profiling. Central Japan is suitable for crustal 38 stress-field analyses on different time scales because it contains one of the world's 39 highest-quality geophysical [e.g., Mazzotti et al., 2001; Townend and Zoback, 2006; 40Terakawa and Matsu'ura, 2010] and geological [e.g., The Research Group for Active 41 Faults of Japan, 1991; Nakata and Imaizumi, 2002] data sets. 42Permanent regional strain in central Japan has been accommodated mainly by active 43faults, which form a dense network in the region [The Research Group for Active Faults 44of Japan, 1991; Nakata and Imaizumi, 2002] (Figure 1). Since the 1995 Kobe 45earthquake, most of the long and fast-slipping faults in the region have been studied 46 extensively through a national active-fault research program, which has produced one of 47the most comprehensive active-fault data sets in the world. Therefore, non-Andersonian 48 faults have gradually become clear; reverse and strike-slip faults are interlaced in this 49 region. In addition, a few of these types of faults have trends subparallel to each other 50while exhibiting different dip angles: the Hanaore and Biwako-seigan faults represent 51such a pair and are interpreted as an example of strain partitioning (Figure 1). Active 52faulting and its relation to the stress field in central Japan have been a topic of debate 53[Huzita, 1968; Okada and Ando, 1979], but the coexistence of faults with different 54senses of motion makes inference difficult without the inclusion of a special type of

55 stress-tensor inversion, as described below.

56Stress-tensor inversion is used to determine stress conditions from the fault-slip data. 57Each datum comprises the attitude of a fault and the slip direction on the fault plane [e.g., Angelier, 1979] (Figure 2a). However, the slip directions are seldom determined 5859along the segments of active faults. Instead, the directions are vaguely documented in 60 the terms of slip senses. For example, the slip direction of a reverse fault has an 61 uncertainty of 180° with respect to the rake direction; the dip occurs at the center of 62possible slip directions for the footwall block (Figure 2b). Similarly, the slip direction of 63 a strike-slip fault has an uncertainty of 180°, but the possible slip direction is horizontal 64 from the center of the slip. A few active faults in central Japan are described as oblique 65reverse faults with sinistral or dextral components. The slip directions of these faults have an uncertainty of 90° (Figure 2c). A fault-slip data set for active faults in central 66 67 Japan includes such deficiencies. *Lisle et al.* [2001] developed a pioneering 68 stress-inversion method to deal with sense-only data. Recently, Sato [2006] developed a 69 special type of stress-inversion method to deal with mixed set of complete and 70sense-only fault-slip data.

71In this study, we apply Sato's [2006] method to the active fault data to derive the 72regional stress field in central Japan. Although the slip inversion of a single active fault 73was conducted by *Blenkinsop* [2006] for the Chelungpu fault that ruptured during the 741999 Chi-Chi earthquake in Taiwan, this is the first study to reveal a regional stress field 75based on the stress inversion analysis of a large set of the active fault data. We show that central Japan is under an ESE-WNW compressional stress field with a small stress ratio, 76 $\Phi = (\sigma_2 - \sigma_3) / (\sigma_1 - \sigma_3)$, and that the regional stress field has been uniform and stable 77over the past $\sim 10^5$ years. 78

80 2. Tectonic setting

81	To the east of the Japanese islands, the Pacific plate is subducted westward beneath
82	the North American and Philippine Sea plates (Figure 1). Along the Nankai trough, the
83	Philippine Sea plate has been subducting northwestward since the Pliocene or
84	mid-Pleistocene [e.g., Seno and Maruyama, 1984; Yamaji, 2000]. In the study area, i.e.,
85	the eastern part of the southwest Japan arc, north-trending reverse faults and
86	northwest-trending left-lateral and northeast-trending right-lateral strike-slip faults are
87	densely distributed (Figure 1). The offsets of dated geomorphic features indicate slip
88	rates in the order of 10^{-1} to 10^{0} mm/yr for such faults [<i>The Research Group for Active</i>
89	Faults of Japan, 1991]. Central Japan has a long historical earthquake record that has
90	been systematically collected for several centuries [Usami, 2003; Ishibashi, 2004]. The
91	area has experienced one reverse-slip and four strike-slip earthquakes that ruptured the
92	surface since the 1891 Nobi earthquake (Figure 1).
93	Geodetic and seismological data show that the Japan arc is subject to an
94	approximate E-W compression. Mazzotti et al. [2001] calculated the permanent
95	deformation field in central Japan by subtracting short-term elastic deformation related
96	to the locking of the plate interface along the Nankai trough from GPS observations,
97	and they obtained the residual-deformation field indicating ESE-WNW shortening.
98	Townend and Zoback [2006] reported that the maximum horizontal stress is oriented
99	approximately toward ENE-WSW in southwest Japan. Terakawa and Matsu'ura [2010]
100	used the centroid-moment-tensor data to show that the tectonic stress of the Japan arc is
101	basically an E-W compression with the direction of intermediate principal stress
102	changing from N-S in northeast Japan to vertical in southwest Japan.

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104 **3. Data**

105 After the 1995 Kobe earthquake, the Headquarters for Earthquake Research 106 Promotion (HERP) of the Japanese government selected approximately 100 inland 107 active faults and conducted extensive geological and paleoseismological studies to 108 assess their seismic potential. We compiled the fault-slip data from 36 active faults 109 selected by HERP in the Chubu and Kinki districts, to the west of the 110 Itoigawa–Shizuoka tectonic line and east of the Nojima fault that ruptured during the 111 1995 Kobe earthquake (Figure 1). To exclude local-stress perturbation due to the 112collision of the Izu Peninsula with the main island of Japan [e.g., Mazzotti et al., 2001; 113 Townend and Zoback, 2006] from our regional stress analysis, we analyzed the data for 114 the faults to the west of the Itoigawa-Shizuoka tectonic line, which is part of the 115postulated plate boundary between the North American and Eurasian plates [*Nakamura*, 116 1983]. We examined data from paleoseismic trench walls, natural outcrops, and seismic 117 reflection profiles in published reports and maps. To determine the stress regime for a time scale of 10^5 years, we compiled the data on faults that clearly offset geomorphic 118 119 surfaces or strata of late Quaternary age dated by tephrochronology or radiometric 120 methods. Therefore, we catalogued reliable fault orientations and slip senses at 166 sites 121along 36 faults (Table S1 in the auxiliary material). In addition, we catalogued the data 122 from three sites along the Fukozu fault, the source fault of the 1945 Mikawa earthquake 123 that was not selected by HERP but for which extensive paleoseismic trenching was 124conducted [e.g., Sone and Ueta, 1993]. 125The fault-slip data set used in this study had a few deficiencies. Slickenlines were

126 observed to determine the rakes of slip vectors at only 11 sites out of 169. We obtained

127 the "complete" data for 11 sites, and the remaining sites produced "sense-only" data, 128which have the rake uncertainties of 90° or 180° (Figures 2b and c). Figures 2d–f 129illustrate the tangent-lineation diagrams [Twiss and Gefell, 1990], improved by Sato 130 [2006], that display the fault attitude and possible slip directions of the complete and 131 sense-only data. A complete datum is denoted by an arrow plotted by a 132lower-hemisphere, equal-area projection; the pole of the fault plane is depicted in the 133 stereogram by the position of the arrow, which itself indicates the slip direction of the 134 footwall block (Figure 2d). The inward and outward directions of the arrow indicate the 135 reverse and normal senses of shear, respectively. Strike-slip faults are represented by 136 such arrows that are directed perpendicular to the radial directions in the plot. A 137 sense-only datum is denoted by a semicircle or fan, which indicates the possible slip 138 direction of the footwall block (Figures 2e and f). Figure 3 shows the fault-slip data 139 from the active faults in the study area; we recorded a large variation of fault attitudes 140 from 169 sites distributed along 37 faults.

141

142 **4. Stress inversion**

143 The stress-inversion method proposed by Sato [2006] was employed to determine 144 the stress conditions that explain the mixed set of the complete and sense-only data. The 145method can deal with both the complete and sense-only data by placing tighter and 146 looser constraints on the conditions, respectively. The Wallace-Bott hypothesis is 147assumed, as is customary: the slip directions of faults are assumed to be parallel to the 148 resolved shear stresses (theoretical slip directions) on the fault planes, which are 149calculated from the fault attitudes and stress conditions. The fitness of arbitrary stress 150conditions to a datum, i.e., how preferable is the assumption for a fault, is defined as a

151decreasing function of the misfit angle d between the theoretical and observed slip 152directions (Figure 2g). The threshold in the function d_T is set to 30° in this study. For the 153sense-only data, the misfit angles are measured from the center of possible slip 154directions, and the degrees of fit are equal within the possible range (Figures 2h and i). 155According to Sato [2006], all the types of fitness functions are normalized as 156probability-density functions in the parameter space of deviatoric stress, which is 157represented schematically as the heights of fitness values in Figures 2g-i. The degrees 158of fit are added over the entire set of the complete and sense-only data to provide a total 159fitness of stress conditions. The optimal stress conditions are searched to maximize the total fitness. Although the complete data are uncommon in our database (Figure 3 and 160 161 Table S1), the large variation of fault orientations and large number of data enable us to 162 obtain a stress state with a relatively high precision. 163 Figure 4 shows the optimal stress for our data. A reverse-faulting stress-regime with 164 an ESE–WNW-trending σ_1 -axis was found to be capable of explaining almost all the 165data. The stress ratio, $\Phi = (\sigma_2 - \sigma_3) / (\sigma_1 - \sigma_3)$, was determined to be 0.09, which means 166 that the magnitude of σ_2 is approximately equal to that of σ_3 . In addition, Figure 4 167 illustrates the uncertainty of the solution by plotting principal stress axes that have 168fitness values greater than 90% of those of the optimal solution. Because of the small Φ 169 value (axial compressional stress), the σ_3 -axis has a greater uncertainty than that of the 170 σ_1 -axis. We calculated theoretical slip directions for the faults by assuming optimal 171 stress; white arrows in Figure 5 denote these directions.

172

173 5. Discussion

174Despite the large variation of fault orientations (Figures 1 and 3), stress inversion 175revealed that almost all the active faults in the study area are consistent with a 176 reverse-faulting stress regime with ESE–WNW-trending σ_1 -axis (Figure 5). The 177theoretical slip directions of the faults calculated with this optimal stress were consistent 178with all the data except for five of them. Some of these exceptions have fault planes 179 nearly perpendicular to the optimal σ_1 -axis. Theoretical slip directions on such fault 180 planes are unstable as is shown by the radial pattern around the σ_1 -axis in Figure 5. 181 Therefore, small perturbations in fault attitudes can explain the large misfits. 182The optimal stress ratio of 0.09 indicates that σ_2 and σ_3 have similar values. Such a 183 state of stress allows the coexistence of reverse and strike-slip faults, provided that they 184 have different fault orientations. Their coexistence puzzled previous researchers who 185 inferred the stress field from active faults in Japan because they assumed Andersonian 186 faulting [Huzita, 1968; Okada and Ando, 1979]. Consequently, they neglected the 187 coexistence of reverse and strike-slip faults or they had to infer spatially or temporarily 188 complicated stress fields. 189 Although the ESE–WNW compression determined from active faults in this study is

190 generally the same as that proposed by *Huzita* [1968], we demonstrated that a single 191 state of stress explains the fault-slip data from all sites except five of them. This means 192 that the stress field in central Japan has been uniform and that the active faults have 193 slipped in the same directions over the past $\sim 10^5$ years. From the coexistence of reverse 194 and strike-slip faults, we predicted that non-Andersonian, oblique-slip faulting is 195 common in this region although the rakes of slip vectors were observed for only 10 of 196 37 faults.

197 The reactivation of the pre-existing planes of weakness gives rise to the

198	non-Andersonian faulting of planes with a wide variety of orientations. Kano [2002]
199	suggested that a few active faults are present in such planes in the Mesozoic
200	accretionary complex in the northern part of the study area. For example, the left-lateral
201	Yanagase fault (Figure 1) reactivated a kink plane of a map-scale chevron fold.
202	Similarly, the right-lateral Hanaore fault (Figure 1) lies along the axial surface of a fold
203	structure [Kano, 2002]. Ito [2006] obtained the apatite fission track ages of ~20 Ma for
204	dikes intruded along the Yanagase fault, which provides a minimum age constraint for
205	the fault. Murakami and Tagami [2004] conducted the zircon fission-track analysis of
206	pseudotachylyte sampled from the Nojima fault (Figure 1). They suggested that the
207	Nojima fault was already initiated at ~56 Ma. The active Median Tectonic Line (Figure
208	1) follows part of the boundary between the Ryoke and Sanbagawa terranes that were
209	accreted in the Mesozoic [Hashimoto, 1991]. Therefore, a few active faults in central
210	Japan reactivated the pre-existing faults under the present-day stress regime.
211	Slip on the active faults catalogued in this study reflects the average stress regime
212	in the late Quaternary. The inverted stress state determined in this study is principally
213	consistent with that obtained by geodetic and seismological data [Mazzotti et al., 2001;
214	Townend and Zoback, 2006; Terakawa and Matsu'ura, 2010], suggesting that the stress
215	state in central Japan has been uniform and stable for the past $\sim 10^5$ years.
216	

217 **6.** Conclusions

A dense distribution and an extensive data set of active faults in central Japan has provided us with an exceptional opportunity to invert the regional stress field over a time scale of $\sim 10^5$ years. We obtained an optimal state of stress, which is essentially the same as that obtained by seismological and geodetic data, indicating that the stress field

223	Moreover, the inversion results provide a clear explanation for the coexistence of
224	reverse and strike-slip faults in central Japan. Geological observations suggest that a
225	few active faults in central Japan reactivated pre-existing faults under the present-day
226	stress regime.
227	
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230	Prediction for access to the literature on the active faults used in this study and Shigeru

in the eastern part of southwest Japan has been stable over the past $\sim 10^5$ years.

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300 Figure captions

301 Figure 1. Tectonic setting and distribution of active faults in the Kinki and Chubu 302 districts of central Japan. The active fault traces (red lines) are from Nakata and 303 *Imaizumi* [2002], and black arrows denote major strike-slip faults. Blue crosses 304 denote the locations of outcrops, trench sites, and seismic-reflection profiles from 305 where the fault-slip data were collected. Focal-mechanism solutions for historical 306 surface-rupturing earthquakes are also shown by Shiono [1977] and Kikuchi and 307 Kanamori [1996]: 1891 Nobi, 1927 Kita-Tango, 1945 Mikawa, 1948 Fukui, and 308 1995 Kobe earthquakes. Active faults mentioned in the text are Biwako-seigan 309 fault: BF, Fukozu fault: FF, Hanaore fault: HF, Median Tectonic Line: MTL, 310 Nojima fault: NF, and Yanagase fault: YF. Other abbreviations are 311 Itoigawa–Shizuoka tectonic line: ISTL, Kyoto: Ky, Nagoya: Na, Osaka: O. Inset 312shows the plate-tectonic setting of Japanese islands. Eurasian plate: EU, Izu 313 Peninsula: IP, North American plate: NA, Pacific plate: PA, Philippine Sea plate: 314PH. Thick arrows denote convergence directions between the Pacific and North 315 American plates and between the Philippine Sea and Eurasian plates. 316 317 Figure 2. Types of fault-slip data and their constraints on stress condition. Figure (a)

318	shows a complete fault-slip datum comprising the attitude and slip direction of the
319	fault. The direction is indicated by slickenlines on the fault plane. Figures (b) and
320	(c) show the "sense-only" data obtained from faults on which slickenlines are not
321	observed but whose sense of faulting is known from, for example, fault scarps and
322	stream offsets. Either strike-slip sense or dip-slip sense of shear is known in (b),
323	and both are known in (c). The possible slip directions of the footwalls are
324	constrained within the range indicated by the semicircle and quadrant drawn on the
325	fault plane. Figures (d-f) show the fault-slip data expressed in tangent-lineation
326	diagrams [Twiss and Gefell, 1990] improved by Sato [2006]. Panels (d), (e), and (f)
327	correspond to (a), (b), and (c), respectively. Figures (g-i) are graphs showing the
328	fitness functions (bold lines) used in stress inversion, which can deal with all the
329	types of the fault-slip data to determine the state of stress responsible for the
330	observed fault movements. Figure (g) shows a fault with the complete data and the
331	misfit angle d is between the theoretical and observed slip directions. Figures (h)
332	and (i) show the case of a sense-only datum and d is defined as the angle formed
333	by the theoretical slip direction and the central line of the semicircle or the fan.
334	
335	Figure 3. Tangent-lineation diagram of the complete and sense-only fault-slip data
336	obtained from the active faults in the study area. See Figure 2 for the explanations
337	of the symbols.
338	
339	Figure 4. Paired stereograms showing the range of stress conditions admissible for the
340	fault-slip data in Figure 3. The stress ratios and principal orientations of the
341	conditions are indicated by rainbow colors and lower-hemisphere, equal-area

342	projections. Stars denote the optimal orientations. The small circles are the
343	principal axes of stresses with fitness greater than 90% of that of the optimal
344	solution.

346	Figure 5.	Optimal stress axes	s (open stars)	and calculated	theoretical slip directions
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347 (white arrows) plotted on a tangent-lineation diagram with a lower-hemisphere,

- equal-area projection. The fault-slip data are the same as that in Figure 3. The
- fault-slip data shown in red are inconsistent with the theoretical slip directions.
- 350 Note that most of the data agree with the theoretical slip directions.



Figure 1.



Figure 2.



Figure 3.



Figure 4.



Theoretical slip direction for optimal stress condition

Figure 5.

| Foult zone
ID number1) | Name | Fault-slip dat
Site No.

 | a
Data source | Latitude ('N) | Longitude ("E)
 | Strike | Dip | Sense of slip
 | Rake of slip vector2) | Age of foulting3) | Invers
Weight | ion onolysis
Remorks | Dip di | rection
 | 6) Slip | orientatio | on5) |
|----------------------------|---
--
--
|---|---|--
---	--	--	---------------------------
---	------------------------	--------------	------
45	Kisosannyakuseien	45-1	

 | natural outcrop | 35.546 | 137.5859
 | NSE | 458 | right-lateral
 | | Holocene | 1 | | Azimut
275 | h Plung
85
 | Arim | .h Plunge | |
| | | 45-2
45-3

 | notural outcrop
trenching | 35.6654 | 137.6985
 | N54E
N18E | 555
30-580 | right-lateral
reverse, right-lateral
 | | in the post 2000 years
in the post 2000 years | 1 | | 144 | 55
40
 | | | |
| 46 | Sokaitage-Kamiya | 43-4

 | trenching | 35.9421 | 137.7811
 | N2 56 | GSE (north wall) | left-lateral
 | | in the post 2000 years | 1 | | 70 | 65
 | | | |
| | | 40-2

 | trenching | 36.0072 | 137.785
 | N2 ON | SON-vertical | left-lateral
 | | Holocene | 1 | | 250 | 85
 | | | |
| | | 40-4

 | trenching | 35.9986 | 137.7348
 | N258 | 40-685 | left-lateral
 | | Holocene
Joho Ministerrore | 1 | -1 4- 44 4 | 65 | 50
 | | | |
| | | 40-5

 | natural outcrop | 36.0773 | 137.6963
 | NEON | SENE | left-lateral
 | - | late Pleistocene | 0.5 | close to 46-5 | 30 | 58
 | | | |
| | | 40-8

 | notural outcrop | 36.014 | 137.726
 | N4GW | 441 | left-lateral
 | | Holocene | 1 | | 50 | 55
 | | | |
| 47 | Atotsugawa | 47-1
47-2

 | trenching
notural outcrop | 36.3275
36.5218 | 137.1376
 | NERE
NSSE | 65-75N
885E | right-lateral
right-lateral
 | 15W
20-38W | historical (1858)
historical (1858) | 1 | | 330
145 | 70
50
 | 245.2
238.4 | 14.1
24.6 | |
| | | 47-3
47-4

 | geoslicer survey
notural outcrop | 36.453
36.4246 | 137.3181 137.3511
 | NESE
N43E | vertical
BBN | right-lateral
right-lateral
 | | historical (1858)
historical (1858) | 1 | | 335
313 | 98
50
 | | | |
| 48 | Takayana-Oppana | 48-1

 | trenching | 36.1479 | 137.1793
 | NERE | 55-855 | right-lateral
 | | Holocene | 1 | | 150 | 78
 | | | |
| | | 48-2
48-3

 | trenching | 36.1372
36.0466 | 137.3241 137.1746
 | N785
N455 | 50-805
80MM-vertical | right-lateral
right-lateral
 | | Holocene
Holocene | 1
0.5 | close to 48-4 | 108
315 | 65
80
 | | | |
| | | 48-4
48-5

 | trenching | 36.0483
36.0278 | 137.1761 137.1271
 | N35E
N56E | 72NH
vertical | right-lateral
right-lateral
 | | Holocene
Holocene | 0.5
1 | close to 48-3 | 305
320 | 72
98
 | | | |
| | | 48-6

 | notural outcrop | 36.0749 | 137.1092
 | N35E | 7852 | right-lateral
 | | late Pleistocene | 1 | | 125 | 70
 | | | |
| 49 | Ushikubi | 49-1
49-2

 | netural outcrop | 36.2971
36.3843 | 136.9433
 | MERE
MERE | 785
485 | right-lateral
right-lateral
 | | late Pleistocene
Holocene | 1 | | 150
150 | 70
40
 | | | |
| | | 49-5
49-4

 | trenching | 36.3841
36.3839 | 136.9585
 | N55E
N55E | vertical | right-lateral
right-lateral
 | | in the post 2000 years
in the post 2000 years | 0.5
0.5 | close to 49-4
close to 49-3 | 325
325 | 98
98
 | | | |
| | | 49-5
49-6

 | trenching
trenching | 36.3257
36.4073 | 137.0005
 | N552
N452 | 02-72NW
vertical | right-lateral
right-lateral
 | | in the post 2000 years
in the post 2000 years | 1 | | 325
315 | 65
98
 | | | |
| 50 | Shokawa | 58-1

 | notural outcrop | 36.3294 | 136.8429
 | NIGHT | vertical | left-lateral
 | | late Pleistocene | 1 | | 60 | 98
 | | | |
| | | 58-2

 | trenching | 35.9871 | 137.0146
 | N2 ON | 4e-cell
785 | left-lateral
 | | historical (1586) | 1 | | 78 | 78
 | | | |
| 51 | Inadani | 51-1
51-7

 | seismic profiling | 35.4581 | 137.8974
 | N285 | 32-428 | PRVICIAL CONSTANT
 | | late Pleistocene | 1 | | 298 | 35
 | | | |
| | | 51-3
51-4

 | trenching
trenching | 35.6675 35.4521 | 137.8999
137.9686
 | NS
NSRE | 28-258
25-558 | CEVELSE
CEVELSE
 | | Holocene
late Pleistocene | 1 | | 278
328 | 22.5
40
 | | | |
| | | 52-5

 | trenching | 35.3927 | 137.6865
 | NGRE | 428 | right-lateral, reverse
 | | historical (1586 or 1718) | 1 | | 300 | 40
 | | | |
| | ALC U | 52-2

 | netural outcrop | 35.6001 | 137.1989
 | N2.18 | and the second | left-lateral
 | 25-345 | late Pleistocene | 1 | | 69 | 55
 | 157.5 | 29.5 | |
| | | 52-3
52-4

 | trenching | 35.7897 | 137.2952
 | NG SH
N4 SH | JUNE BONE | left-loterol
 | | historical (1586) | 0.5 | close to 52-5 | 45 | 20
20
 | | | |
| | | 52-6

 | netural outcrop | 35.7676 | 137.3227
 | N/W | 82E
BANE | left-lateral
 | | late Pleistocene | 1 | | 43
50 | 82
80
 | | | |
| | | 52-8

 | trenching | 35.7456 | 137.3406
 | N458 | 75NE
vartical | left-loteral
 | | Holocene
Molocene | 1 | | 45 | 75
 | | | |
| | | 52-10
52-11

 | netural outcrep
trenching | 35.6125 | 137.487
 | N30W
N45W | BONE
75NE | left-loteral
left-loteral
 | | Holocene
Holocene | 1 | | 60
45 | 80
75
 | | | |
| | | 52-12
52-13

 | trenching | 35.5356
35.5347 | 137.5656
 | N428
N438 | 8058
85ML | left-lateral
left-lateral
 | | Holocene
Holocene | 0.5
0.5 | close to 52-13
close to 52-14 | 228
42 | 80
85
 | | | |
| 53 | Byobuyana-Enasan | 53-1

 | trenching | 35.3640 | 137.4524
 | NSRE | 38-5858 | reverse, right-lateral
 | | Holocene | 1 | | 140 | 40
 | | | |
| 54 | Senopryana | 54-1

 | trenching, borehole survey | 35.2173 | 137.1631
 | N40E | 8052 | right-lateral
 | | Holocene | 1 | | 130 | 50
 | | | |
| | Buchiasta | 54-2

 | seismic profiling | 34.8815 | 136.9141
 | N2 DN | 52W
2057 | CRIVEDIA
CRIVEDIA
 | | late Pleistocene | 1 | close to 57 3 | 250 | 80
72
 | | | |
| | | 55-2

 | trenching | 36.9123 | 136.8404
 | NHOE | 2052 | reverse
 | | in the post 2000 years | 0.5 | close to 55-1 | 130 | 28
 | | | |
| 56 | Tonamiheiyo-Kurehayana | 56-1
56-2

 | seismic profiling
trenching | 36.5653
36.5478 | 136.8541
136.9688
 | N45Z
NEOE | 45-528
385 | reverse
reverse
 | | late Pleistocene
Holocene | 1 | | 315
150 | 47.5
30
 | | | |
| | | 56-3
56-4

 | trenching
seismic profiling | 36.5865
36.6815 | 136.9183
137.1617
 | M2/0E
ME/0E | 20E
45MB | reverse
 | | Holocene
late Pleistocene | 1 | | 110
330 | 28
45
 | | | |
| 57 | Morimoto-Togoshi | 57-1

 | trenching | 36.6239 | 136.7829
 | N38E | 238 | reverse
 | | Holocene | 1 | | 120 | 23
 | | | |
| 58 | Fukuthetystoen | 58-1
58-2

 | notural outcrop
trenching | 36.2981
36.1998 | 136.2397 136.2727
 | NE-158
NSE | 62E-vertical
80E-vertical | reverse
left-lateral, reverse
 | | late Pleistocene
Holocene | 1 | | 78.5
95 | 76
85
 | | | |
| 59 | Neganogawajyonyu | 59-1

 | netural outcrop | 35.4222 | 136.8629
 | NE-108 | 65-888 | left-loteral
 | | late Pleistocene | 1 | | 261 | 72.5
 | | | |
| 60 | Nobi | 68-1

 | trenching | 35.6589 | 136.5868
 | N4ON | 085# | left-lateral
 | | historical (1981) | 1 | | 230 | 60
 | | | |
| | | 68-2
68-3

 | trenching
trenching | 35.512
35.5221 | 136.7683
 | NE-ON
NE-ON | vertical | left-lateral
left-lateral
 | | historical (1981)
historical (1981) | 1 | | 30
30 | 98
98
 | | | |
| | | 62-4
62-5

 | notural outcrop
trenching | 35.5857
35.5757 | 136.6678
 | N4 SR
N3 GR | 63E
83E | left-lateral
left-lateral
 | | historical (1981)
historical (1981) | 1 | | 47
60 | 63
63
 | | | |
| | | 62-6
62-7

 | trenching
trenching | 35.7998
35.6159 | 136.4838
 | ND SW | 70-755W
vertical | left-lateral
left-lateral
 | 245 | historical (1981)
historical (1981) | 1 | | 285
55 | 72.5
98
 | 145 | 24 | |
| | | 68-8

 | trenching | 35.7356
35.7364 | 136.4275
 | N4OW
N4OW | 005W-vertical | left-lateral
left-lateral
 | | in the post 2000 years
in the post 2000 years | 0.5 | close to 60-5 | 50
230 | 98
75
 | | | |
| | × | 68-18

 | notural outcrop | 35.6124 | 136.6818
 | NSSR | ISNE . | left-lateral
 | | late Pleistocene | 1 | | 35 | 85
 | | | |
| ** | To high the | 61-2

 | netural outcrop | 35.6011 | 136.1821
 | N248 | vertical | left-lateral
 | 10.100 | Holocene | 1 | | 66 | 90
 | | | |
| | | 61-6

 | notural outcrop | 35.7093 | 136.1566
 | N10-20 | ¥ 58-686 | left-lateral
 | 20-205 | late Pleistocene | 1 | | 75 | 55
 | 330.1 | 24.4 | |
| | | 61-8

 | trenching | 35.4579 | 136.3325
 | NEON | vertical | left-lateral
 | | Holocene | 0.5 | close to 61-7 | 30 | 98
 | | | |
| 62 | Sekigahara | 62-1

 | notural outcrop | 35.3759 | 135.401
 | N148 | 820 | reverse
 | | Holocene | 1 | | 76 | 80
 | | | |
| 63 | Nosako-Shufukuji | 63-1

 | trenching | 35.0888 | 136.0376
 | NESK | vertical | left-lateral
 | | historical (16627) | 1 | | 25 | 98
 | | | |
| 64 | Kohokusanchi | 64-1
64-2

 | pit excavation
pit excavation | 35.5783 | 136.1052
 | N38E
N45E | 785 | right-lateral
right-lateral
 | | in the post 2000 years
Holocene | 0.5 | close to 64-3 | 128 | 78
 | | | |
| | | 64-3

 | trenching | 35.5538 | 136.0336
 | N285 | 458 | right-lateral, reverse
 | | historical (1325) | 1 | close to 64-2 | 110 | 45
 | | | |
| 65 | Dieckoseigen | 65-1-1
65-1-2

 | seismic profiling | 35.1572 | 135.9244
 | N158 | 428 (0-3km depth)
358 (3-5km depth) | Peverse
Peverse
 | | late Pleistocene | 0.5
0.5 | close to 65-1-2
close to 65-1-1 | 255
255 | 40
35
 | | | |
| | | 65-2
65-3

 | trenching | 35.4719
35.4189 | 136.0246
 | N25E
N28E | 32MB
15-32M | Peverse
Peverse
 | | Holocene
Holocene | 1 | | 295
290 | 30
22.5
 | | | |
| | | 65-4-2
65-4-3

 | trentning | 33.3656 | 136.0326
 | NLOC
NLOC | 32W (No. 2 trench)
32W (No. 3 trench) | reverse
 | | Holocene
Holocene | 0.333 | close to 65-4-2, 3
close to 65-4-3, 1
close to 65-4-1 7 | 200
200
220 | 38
 | | | |
| 67 | Yoro-Kuwano-Yokkai chi | 67-1

 | seismic profiling | 35.2282 | 136.6133
 | NIGHT | 328 | reverse
 | | late Pleistocene | 1 | | 240 | 30
 | | | |
| 68 | Suzukatoen | 68-1

 | seismic profiling | 35.1261 | 136.5062
 | NOR | 628 | reverse
 | | late Pleistocene | 1 | | 205 | 60
 | | | |
| | | 68-2
68-3
68-4

 | notural outcrop
trenching
trenching | 35.1288
35.1268
35.187 | 136.5054 136.5031 136.4073
 | NS
NSR
NSR | 528
628
528 | reverse
reverse
 | | late Pleistocene
in the post 2000 years
Wolcome | 1 | | 278
265
285 | 50
60
10
 | | | |
| | | 68-5

 | trenching | 35.0577 | 136.4953
 | N35E | 328 | PRV8F34
 | | Holocene | ĩ | | 385 | 30
 | | | |
| 60 | Suzukaseten | 69-1

 | seismic profiling | 35.1529 | 136.2805
 | NOR | 32-485 | reverse
 | | | 1 | | 85 | 22
 | | | |
| 70 | Nunobikisanchitoen | 78-1

 | trenching | 34.4322 | 136.4156
 | NG N | 158 | reverse
 | | late Pleistocene | 0.5 | close to 71-2 | 200 | 15
 | | | |
| | | 71-2
71-3

 | trenching
trenching | 34.8171
34.8179 | 136.4147
136.411
 | NLOW
NLOW | 30-58E
65E | PRVICIAL
PRVICIAL
 | | late Pleistocene
late Pleistocene | 0.5
0.5 | close to 71-1
close to 71-4 | 80
75 | 40
65
 | | | |
| | | 71-4
71-5

 | seismic profiling
seismic profiling | 34.8193 | 136.4154
 | NLOW
NS | 50-628
528 | reverse
 | | late Pleistocene
Late Pleistocene | 0.5 | close to 71-3 | 208 | 50
 | | | |
| | | 71-7

 | trenching
netural outcree | 34.5837 | 136.4649
 | NOR | 158 | reverse
reverse
 | | Holocene
Holocene | 1 | | 205 | 15
15
 | | | |
| | | 71-9

 | trenching | 34.4785 | 136.4438
 | N1.5W | 428 | PRV8F34
 | | late Pleistocene | ĩ | | 255 | 40
 | | | |
| 72 | Kizugawa | 72-1
72-2

 | trenching | 34.7957
34.7783 | 136.1042
136.0242
 | NECE
NECE | SE-SEN
GEN | reverse, right-lateral
reverse, right-lateral
 | | historical (1854)
in the past 2000 years | 1 | | 332 | 40
66
 | | | |
| 73 | Ni kata-Hanaore | 73-1
73-2

 | trenching | 35.5888
35.3955 | 135.91
135.9298
 | NSE
N34E | 30-500
vertical | reverse
right-lateral
 | | in the post 2000 years
historical (1662) | 1
0.5 | close to 73-3 | 95
124 | 40
50
 | | | |
| | | 73-3
73-4

 | trenching
netural outcrop | 35.3932
35.3844 | 135.929
135.8917
 | NZ BE
N36E | 62-82W
5858 | right-lateral
right-lateral
 | | historical (1662)
late Pleistocene | 0.5
1 | close to 73-2 | 298
126 | 78
58
 | | | |
| | | 73-5
73-6

 | netural outcrop
netural outcrop | 35.1493
35.144 | 135.8452
135.8415
 | N28-25
N34E | E 70-75E
82MB | right-lateral right-lateral
 | | late Pleistocene
late Pleistocene | 1 | | 112.5
304 | 72.5
82
 | | | |
| | | 73-7
73-8-1

 | trenching
trenching | 35.0504
35.0280 | 135.8009
135.7862
 | N30E
N30-40 | 00-800
300-500 | right-lateral, reverse
reverse
 | | Holocene
Holocene | 1
0.333 | close to 73-8-2, 73-9 | 120
125 | 70
30
 | | | |
| | | /3-8-2
73-9

 | borehole survey
borehole survey | 35.0248 | 135.7839
 | N38E
N28E | 58-685 | reverse
reverse
 | | Holocene | 0.333
0.333 | ciose to 73-8-1, 73-9
close to 73-8-1, 73-8-2 | 120 | 58
55
 | | | |
| 74 | Yemada |

 | | |
 | | |
 | | | | | 320 | 40
 | | | |
| | | 74-1
74-2

 | trenching | 35.5393
35.6413 | 135.1116
135.0674
 | NS BE
N2 BW | 42MM
vertical | right-lateral, reverse
left-lateral
 | | historical (1927)
late Pleistocene | 1 | | 70 | 240
 | 336.4 | 33.4 | |
| 75 | | 74-1
74-2
74-3

 | trenching
trenching
trenching | 35.5393
35.6413
35.6525 | 135.1116
135.0674
135.0327
 | N5-00
N2-08
N2-48 | 4258
vertical
7658 | right-lateral, reverse
left-lateral
left-lateral, reverse
 | 32-40N | historical (1927)
Late Pleistocene
historical (1927) | 1
1
1 | | 78
256 | 76
 | | | |
| 76 | Kyotobanchi-Narabanchi | 74-1
74-2
74-3
75-1
75-2

 | trenching
trenching
trenching
seismic profiling
seismic profiling | 35.5395
35.6413
35.6525
34.6351
34.635 | 135.1116
135.0674
135.0327
135.8226
135.8247
 | N5/0E
N2/0W
N1/4W
N1/0W
N1/0W | 4558
vertical
7058
50-680
50-680 | right-lateral, reverse
left-lateral
left-lateral, reverse
reverse
reverse
 | 30-40N | historical (1927)
late Pleistocene
historical (1927)
late Pleistocene
late Pleistocene | 1 | | 78
256
88
88 | 76
75
55
 | | 1.0 | |
| | Kyotabanchi-Narabanchi
Arimo-Takotsuki | 74-1
74-2
74-3
75-1
75-2
78-1
78-2

 | trenching
trenching
trenching
seismic profiling
seismic profiling
netural outcrop
netural outcrop | 35.5395
35.6413
35.6525
34.6351
34.635
34.7377
34.835 | 135.1116
135.8674
135.8327
135.8327
135.8347
135.8347
135.2586
135.2758
 | NG-00
NG-00
NG-00
NG-00
NG-20
NG-20
NG-20
NG-20
NG-20 | 4088
vertical
7058
58-686
58-686
425
635 | right-lateral, reverse
left-lateral
left-lateral, reverse
reverse
right-lateral, reverse
right-lateral, reverse
 | 30-40N
5-15E | historical (1927)
Late Pleistocene
historical (1927)
Late Pleistocene
Late Pleistocene
historical (1596)
Bolocene | 1 1 1 1 1 1 1 0.5 | close to 78-4 | 78
256
88
88
152
17 ⁶ | 50 76 55 55 42 65
 | 99.7 | | |
| | Kyotobanchi-Narabanchi
Arimo-Takatsuki | 74-1
74-2
74-3
75-1
75-2
78-1
78-2
78-3
78-4

 | trenching
trenching
asismic profiling
asismic profiling
natural outcrop
natural outcrop
trenching
trenching | 35.5393
35.6413
33.6525
34.6355
34.635
34.7977
34.8934
34.8936
34.8936
34.825 | 135.1116
135.8674
135.8276
135.8276
135.8347
135.2586
135.2586
135.2749
135.2749
135.4189
 | NG-RE
N2-DW
N1-DW
N1-DW
NE-22
NE-22
NE-22
NE-22
NE-22
NE-22
NE-22 | 4058
59-605
59-605
59-605
425
635
225
325
925
925 | right-lateral, reverse
left-lateral, reverse
reverse
right-lateral, reverse
right-lateral, reverse
right-lateral, reverse
right-lateral, reverse
right-lateral
 | 32-40N
5-132 | historical (1927)
late Pleistocene
historical (1927)
late Pleistocene
late Pleistocene
historical (1990)
historical (1990)
historical (1990) | 1
1
1
1
0.5
0.5
1 | close to 76-3
close to 76-2 | 70
256
80
152
176
153
330 | 90 FF 55 55 42 55 12 80
 | 98.6 | | |
| | Kyotobanchi-Narabanchi
Arimo-Takatuski | 74-1
74-2
74-3
75-1
75-2
78-2
78-3
78-4
78-5
78-6

 | trenching
trenching
trenching
satumic profiling
satumic profiling
netural autrop
netural autrop
trenching
trenching
trenching
trenching
netural autrop | 35, 5393
35, 6413
35, 6525
34, 6351
34, 635
34, 635
34, 8936
34, 8936
34, 8936
34, 8936
34, 825
34, 822
34, 8221
34, 8221 | 135.1116
135.0074
135.0327
135.8226
135.8347
135.2586
135.2786
135.2740
135.2740
135.4109
135.4109
135.4481
 | NSIDE
N210W
N14W
N20W
N20W
N20E
N20E
N20E
N20E
N20E | 4058
Vertical
7058
59-080
425
635
325
Vertical
Vertical | right-lateral, reverse
Left-lateral
Left-lateral
reverse
reverse
right-lateral, reverse
right-lateral, reverse
right-lateral
right-lateral
 | 38-40N
5-25E | historical (1927)
Late Pleistoceme
historical (1927)
Lote Pleistoceme
Late Pleistoceme
historical (1986)
Mistorical (1986)
historical (1986)
historical (1986) | 1
1
1
0.5
0.5
1
0.5
0.5 | closs to 76-3
closs to 76-2
closs to 76-6
closs to 76-3 | 70
256
80
152
175
153
330
340
340 | 8 F2 55 5 4 5 1 8 8 8
 | 90.6 | | |
| | Kyutabonchi-Narabonchi
Arimo-Tokatsuki | 74-1
74-2
75-1
75-2
76-1
76-2
76-3
76-4
76-5
76-6
76-6
76-6
76-7
76-8

 | tranching
tranching
axiamic profiling
axiamic profiling
axiamic profiling
axiamic axicrep
tranching
tranching
tranching
tranching
tranching
tranching
tranching | 35.5393
35.6413
35.6525
34.6351
34.635
34.8954
34.8954
34.8955
34.825
34.825
34.825
34.825
34.825
34.825
34.825
34.829
34.829
34.849 | 135.1116
135.8014
135.8327
135.8286
135.8347
135.733
135.733
135.740
135.4421
135.4421
135.4481
135.5685
 | N505
N208
N148
N508
N508
N505
N505
N705
N705
N705
N705
N705 | 4888
Vertical
7558
58-686
425
635
325
Vertical
Vertical
Vertical
Vertical
Vertical | right-lateral, reverse
left-lateral, reverse
reverse
reverse
right-lateral, reverse
right-lateral, reverse
right-lateral, reverse
right-lateral
right-lateral
right-lateral
 | 32-481
5-151 | historial (1827)
Late Fisikacome
Late Fisikacome
Late Fisikacome
Nistorial (1980)
Mistorial (1980)
Mistorial (1980)
Mistorial (1980)
Mistorial (1980)
Mistorial (1980) | 1
1
1
1
0.5
0.5
1
0.5
1
1
1 | cleas to 76-3
cleas to 76-2
cleas to 76-6
cleas to 76-5 | 70
256
80
152
176
153
330
340
340
335
100 |
 | 98.6 | | |
| 77 | Kyutabanchi -Nurubanchi
Arimo-Tokatuski
Jikama | 74-1
74-3
75-1
75-2
76-1
76-2
76-3
76-4
76-5
76-6
76-6
76-6
77-1
77-2

 | tranching
tranching
axiamic profiling
axiamic profiling
andurul autcrap
natural autcrap
tranching
tranching
tranching
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tranching
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tranching
tranching
tranching
tranching | 33.53383
33.6413
33.6825
34.6355
34.8355
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77 78 79	Kyntawsti - Berginski Ar ene - Sekraukt Hone Birtake Aysterfahryne Rakke Angrichten	 福二 福二 福二 石 石<!--</td--><td>sunding beaching beaching sensitive profiling method altrong method altrong method altrong method altrong sensitive</td><td>53.343 33.443 34.435 34.353 34.353 34.787 34.787 34.787 34.327</td><td>155.1116 155.8074 155.8074 155.8077 155.8077 155.8077 155.807 155.807 155.407 155.407 155.407 155.407 155.407 155.407 155.509 155.100 155.109 155.10</td><td>1502 500 100 100 100 100 100 100 100 100 100</td><td>هود المعالية الم المعالية المعالية المعال معالية المعالية المعال معالية معالية المعالية المعالية المعالية معالية المعالية معالية معالية معالية معالية معاليمانية معاليم معالية معالية معالية مما</td><td>nghi-tent, reverse tert-tent, reverse reverse reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse re</td><td>32-400 5-332 282</td><td>historial (1997) Las Factorian (1997) Las Factorian (1997) Las Factorian (1998) Restructures (1998) Historial (1998</td><td>$\begin{smallmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\$</td><td>dase to 76-1 dase to 76-2 dase to 77-2 dase to 77-2 da</td><td>78 58 50 51 52 52 52 52 52 52 52 52 52 52 52 52 52</td><td>907 555 42 65 12 90 90 90 90 90 90 90 90 90 90 90 90 90</td><td>90.6 129.7</td><td>27.5</td><td></td>	sunding beaching beaching sensitive profiling method altrong method altrong method altrong method altrong sensitive	53.343 33.443 34.435 34.353 34.353 34.787 34.787 34.787 34.327	155.1116 155.8074 155.8074 155.8077 155.8077 155.8077 155.807 155.807 155.407 155.407 155.407 155.407 155.407 155.407 155.509 155.100 155.109 155.10	1502 500 100 100 100 100 100 100 100 100 100	هود المعالية الم المعالية المعالية المعال معالية المعالية المعال معالية معالية المعالية المعالية المعالية معالية المعالية معالية معالية معالية معالية معاليمانية معاليم معالية معالية معالية مما	nghi-tent, reverse tert-tent, reverse reverse reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse right-tent, reverse re	32-400 5-332 282	historial (1997) Las Factorian (1997) Las Factorian (1997) Las Factorian (1998) Restructures (1998) Historial (1998	$\begin{smallmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\$	dase to 76-1 dase to 76-2 dase to 77-2 dase to 77-2 da	78 58 50 51 52 52 52 52 52 52 52 52 52 52 52 52 52	907 555 42 65 12 90 90 90 90 90 90 90 90 90 90 90 90 90	90.6 129.7	27.5	
77 78 79	Kynthenetti. Anndenetti. Arsen Takitaski Hann Mitaka Aystari Akiyana Rakka Angitakan	74.1 74.2 74.2 75.2 76.7 76.7 76.7 77.7 77.7 7.7 7.7 7.7 7.	nunding hundring wateries profiling wateries profiling wateries profiling wateries w	53.343 33.443 34.435 34.353 34.353 34.353 34.353 34.325	155.116 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.427 155.427 155.427 155.427 155.527 155.527 155.527 155.129 155	1502 500 1500 1500 1500 1500 1500 1500 1		որեւնութ, ռուսու ուրեւնութ, ուրու ուրեւնութ, ուրու ուրեւնութ, ուրու որեչնութ, ուրու որեչնութ, ուրու որեչնութ, ուրու որեչնութ, ուրուսու ուրու ուրու ուրու ուրու ուրու	20-48) 5-132 282	historial (1997) historial (1997) Lis Friedmann Automatical (1998) historial (19	$\begin{smallmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 0.1 \\ 0.5 \\ 0.1 \\ 1 \\ 0.5 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 0.5 \\ 0.5 \\ 0.5 \\ 0.5 \\ 0.5 \\ 0.5 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ $	(1889 10 76-5) (1889 10 76-5) (1889 10 76-5) (1889 10 77-5) (1889 10 77-5)	78 226 30 30 31 21 21 21 21 21 330 340 340 333 330 340 340 340 35 30 90 45 21 21 50 30 90 45 21 21 51 21 21 21 21 21 21 21 21 21 21 21 21 21	1977、555、424511199、90、90、90、90、90、91、555、42451119、90、90、90、90、90、90、90、90、90、90、90、90、90	90.6 229.1	27.3	
77 78 79	Kynteinen tie Sergenen tie Ar een Teatrach 1 Daen Mittale Apatenteil types Reise Registration	 福山 福島 1 	uniting subset	55.3543 35.643 36.625 34.625 34.625 34.625 34.625 34.625 34.625 34.625 34.625 34.625 34.625 34.627 35.346 35.4267 35.346 35.427 35.34635.346 35.34635.346 35.346 35.346 35.346 35.346 35.346 35.346 35.346 35.34635.346	155.116 155.827 155.827 155.827 155.827 155.127 155.228 155.278 155.278 155.278 155.278 155.278 155.278 155.278 155.278 155.278 155.287 155.509 155.509 155.509 155.186 155	1602 1620 1620 1620 1620 1620 1620 1620	تلایم است	որեչները։ հետեսություն որեչները։ որեչներ։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչները։ որեչներ։ որ	20-400 5-332 202	Natural (1997) Set of the second sec	$\begin{smallmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 0.5 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 0.5 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ $	dan 0.763 dan 0.764 dan 0.764 dan 0.774 dan 0.7744 dan 0.77444 dan 0.7744 dan 0.7744 dan 0.77444 dan 0.77444 dan 0.77444 dan 0.77444 dan 0.77444 dan 0.774444 dan 0.774444 dan 0.7744444444444444444444444444444444444	78 226 30 30 31 31 320 330 330 330 330 330 330 330 330 330	9076 5555 4265 1299 909 909 909 909 909 909 909 909 909	90.6 129.3	27.5	
77 78 79 80	Kynthenit i Anglendi Ar een Sektendi Hann Katan Applantak Ayan Ankto-Angletak Umeni	24-12 24-12 25-17 27-17	sunding transmission metana darrang metana darrang metana darrang metana darrang metana darrang metana darrang transmission transmissio	55.3643 35.643 36.653 34.655 34.655 34.657 34.829 34.82	155.116 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.827 155.428 155.428 155.429 155	16026 16208 16208 16208 16208 16208 16208 16202 162002 16202 16202 16202 16202 16202 16202 16202 16202 16202 1620	المعند ال	որեչները որեչներ որեչները որեչներ որեչներ որեչներ որեչներ որեչները որեչները որեչները	24-48 5-32 28 38	historial (1997) Las Franciscov Ser Francisc	$\begin{smallmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 0.5 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 0.5 \\ 0.5 \\ 1 \\ 0.5 \\ 1 \\ 0.5 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ $	daw 10 764 daw 10 764 daw 10 764 daw 10 764 daw 10 774 daw 10 774	78 226 38 39 1122 126 125 125 125 3340 340 340 350 20 20 20 20 20 20 20 20 20 20 20 20 20	907 555 42 GL 200 90 90 90 90 90 90 90 90 90 90 90 90 9	98.6 129.3 281.6	27.5	
77 78 79 80 81	Kynthenell Andrednell Arsen Telestanki Risen Riska System Kallon Risk Angel Alban Risk Angel Alban Risk Market Litter Charlen Rest Hangel Charlos Hangel	14.4.2.2.2.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4	nunding weekin	15.3643 33.6453 34.635 34.635 34.635 34.635 34.635 34.635 34.635 34.635 34.635 34.635 34.6376 34.63766 34.63766357676 357676 357676 357676	155.116 155.824 155.827 155.827 155.827 155.827 155.827 155.827 155.928 155	16026 16208 16008 16008 16008 16008 16008 16008 16008 16008			30 48) 5-132 28	historial (1997) istorial (1997) istorial (1997) istorial (1997) istorial (1998) istorial (1998) istor	111 11 10.0.1 0.0.1 10.0.0.0.10.0.10.0.	chan to 26.4 chan	78 256 88 89 152 153 154 154 160 98 98 98 98 98 98 98 98 98 98	907 555 42 G 12 90 90 90 90 90 15 15 90 70 42 70 G G 62 75 25 80 90 15 90 90 90 90 90 90 90 90 15 90 97 97 96 47 75 96 46 47 75 96 46 47 75 96 46 47 75 96 46 46 47 75 96 46 46 46 47 75 96 46 46 46 46 46 46 46 46 46 46 46 46 46	98.6 129.3 281.0	27.3	
77 78 79 80	Kynchensti Langemont Ar ene "Rakstak 1 Item Mittele Agetentaktysen Rakstang (Jaken Mannet)	74.1.2 74.1.2 74.1.2 76.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.	sunday westers profiles westers profiles westers profiles westers west	15.32413 35.4413 36.4533 34.4533 34.4537 34.8537 34.8284 34.829	135.116 135.827 135	16026 16208 16008 16008 16008 16008 16008	للاست المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحت المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتج المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتجة المحتحة المحتحة المحتحة المحتح المحتج		30-446 5-332 282	historial (1997) test practices of the second seco	111 11 10.01 55 11 10.0 11 10.00 0.01 0.001 0.001 11111 1 11155 15	daan ta 20.4 daan ta 20.4	78 256 88 89 152 153 154 154 154 155 156 156 157 156 157 156 156 157 156 156 156 156 156 156 156 156	30 7. 55 55 42 51 50 50 50 50 50 50 50 50 50 50 50 50 50	98.6 129.3 281.6	83	
77 78 79 80	Kynthensti Andreinel Arise-Seitzaki Hom Riche-Gynterfolgen Riche-Gynterfolgen Homon	74.11.11.11.11.11.11.11.11.11.11.11.11.11	number personal status perfiting manual autore status performance stat	95.35413 35.6413 36.633 36.633 36.633 36.633 36.633 36.635 36.635 36.635 36.635 36.635 36.635 36.645	135.116 135.827 135	16026 161208			38-489 5-335 282	historial (1997) istorial (1997) istorial (1997) istorial (1998) istorial (1998) istor	111 11 10.015 10.00 11 10.00.010.001 00.01 1111 1 1110.00110.000		78 256 88 88 89 152 153 153 153 153 153 153 153 153	30 77 75 55 55 55 55 55 55 55 55 55 55 55 5	90.6 129.7 281.6	83	
77 78 79 80 81	Kynchenist: Sangebendi Arten Faktenski Marker Anten Aynerskehen Anten Aynerskehen Camerki Marker Marker	14.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	nunding hundring hund	91.309 32.6413 33.6523 34.6353 34.6353 34.6353 34.6353 34.625 34.255 34.2555 34.2555 34.2555 34.2555 34.2	155.116 155.827 155.827 155.827 155.827 155.827 155.827 155.126 155	16.026 16.028	تلای تلا تلای		30-44) 5-33 38	historial (1997) issues and (1997) issues and (1997) issues and (1998) issues and (19	111 11 10.0.10.0.11 0.0.11 10.0.0.0.10.0.10.0.11111 1 11150.15555 1555	chan to 26.3 chan to 26.4 chan to 26.4 chan to 26.4 chan to 27.4 chan	78 256 88 88 88 83 152 153 153 153 153 153 153 153 153	30 76 55 55 55 55 55 55 55 55 55 55 56 42 50 90 90 90 90 90 90 90 90 90 90 90 90	90.6 129.3 281.6	27.3 34.3	

Table 51 Fault-slip data from 37 active faults in central Japan

 $\label{eq:result} \begin{array}{|c|c|c|c|c|} \hline p-2 & menting & 34.EB & 10.7.0^* & ME & 56 & ments\\ \hline p Delignets by the Inducators of Estructures functions of the Jaconsex generates (124), regulates, p-jubic/values.html).\\ \hline 2 Bain angle 4 slip direction measured dammed from the direction of static identified by the last denotes: \\ \hline 3 Diam of the Isa denotes of the static posterior static stat$