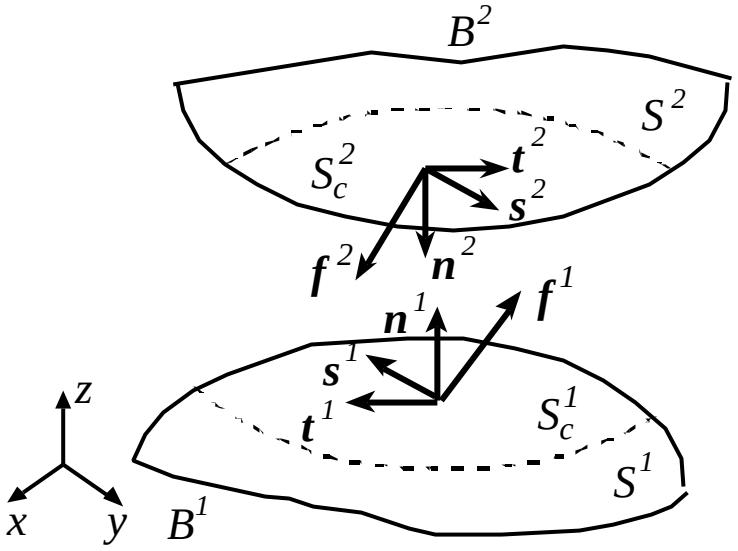


Fig. 1 Bodies in contact with each other

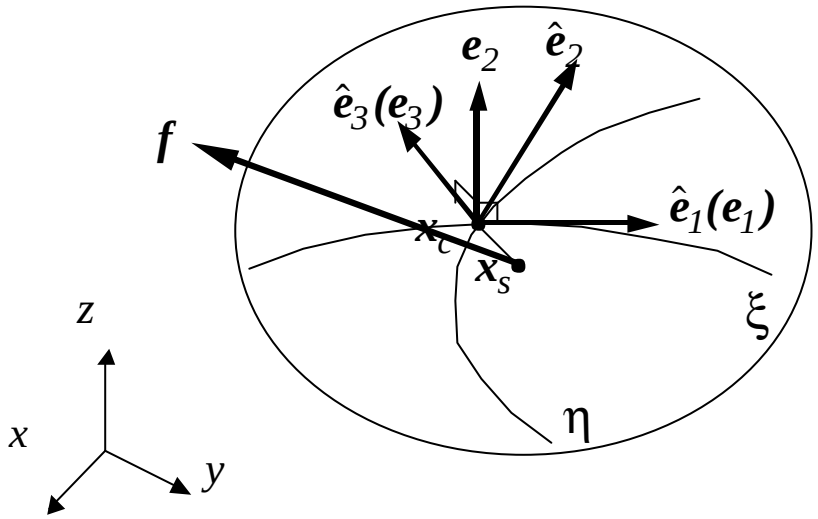
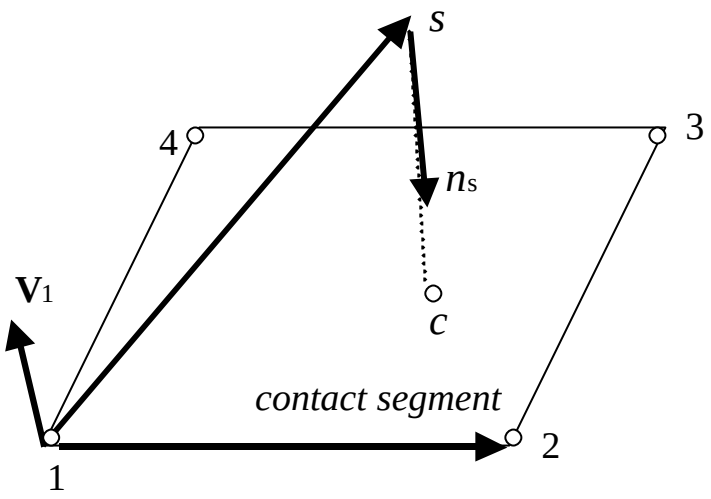


Fig.2 Frame for calculation of the contact stress



$$\mathbf{V}_i = \vec{ik} \times \vec{is} \quad (i = 1,4)$$

$$k = i + 1 \; if \; i = 1,3, \; otherwise \; k = 1$$

Fig. 3 Local contact search algorithm

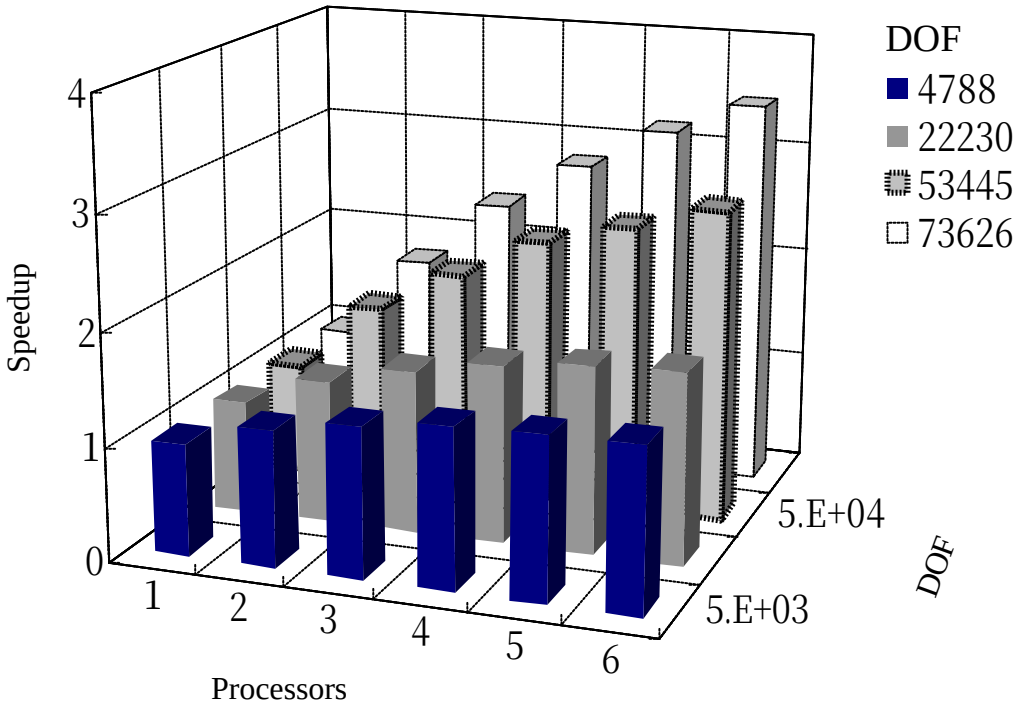


Fig.4 Speedup for different cases

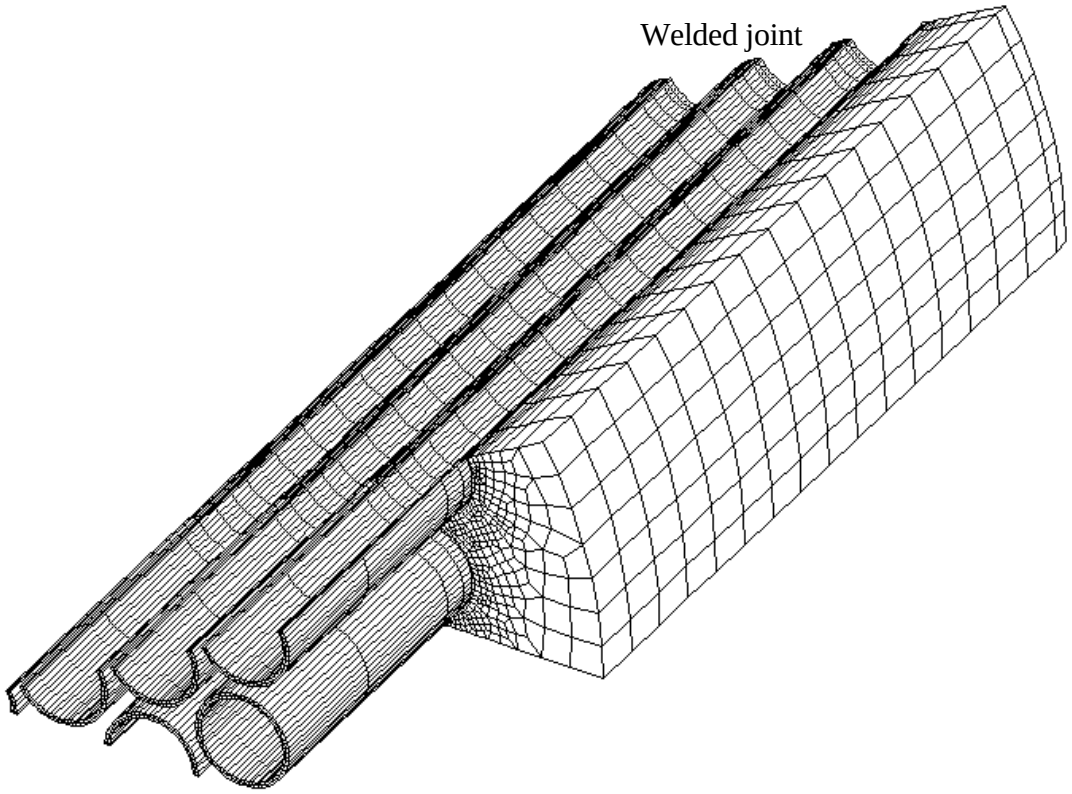


Fig. 5 The geometry and mesh of tube and tubesheet structure analyzed

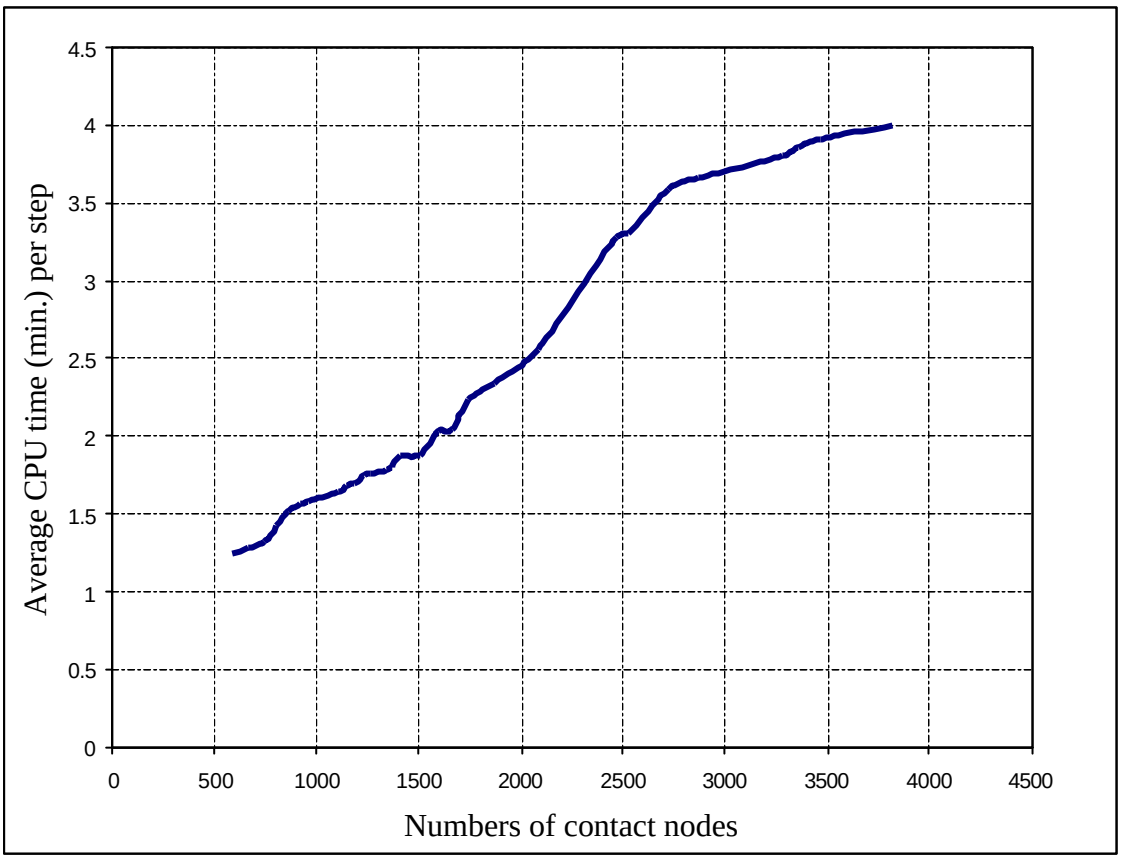


Fig. 6 Average CPU time vs. numbers of contact nodes

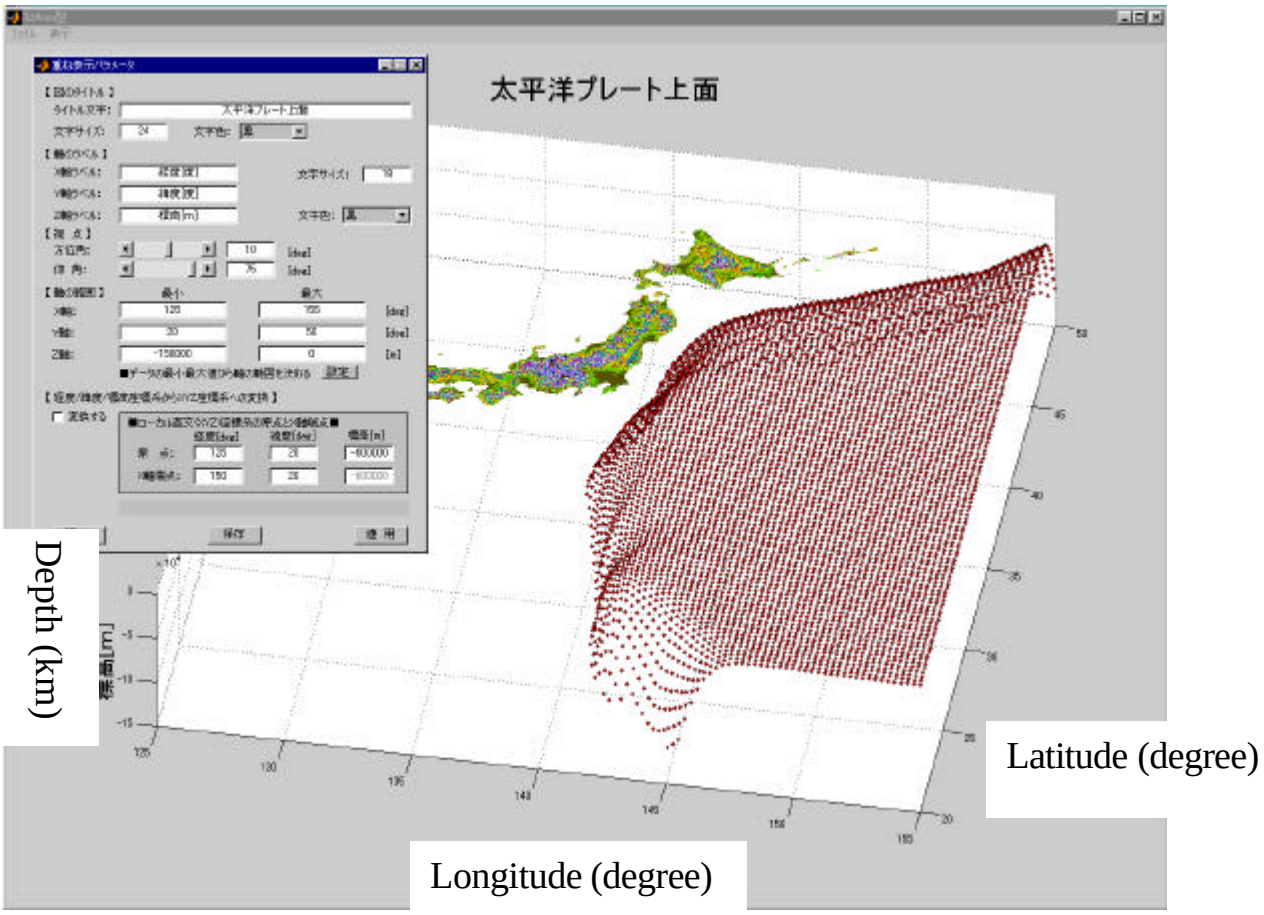


Fig. 7 The upper surface of the Pacific plate around Japan (Kanai, 2000)

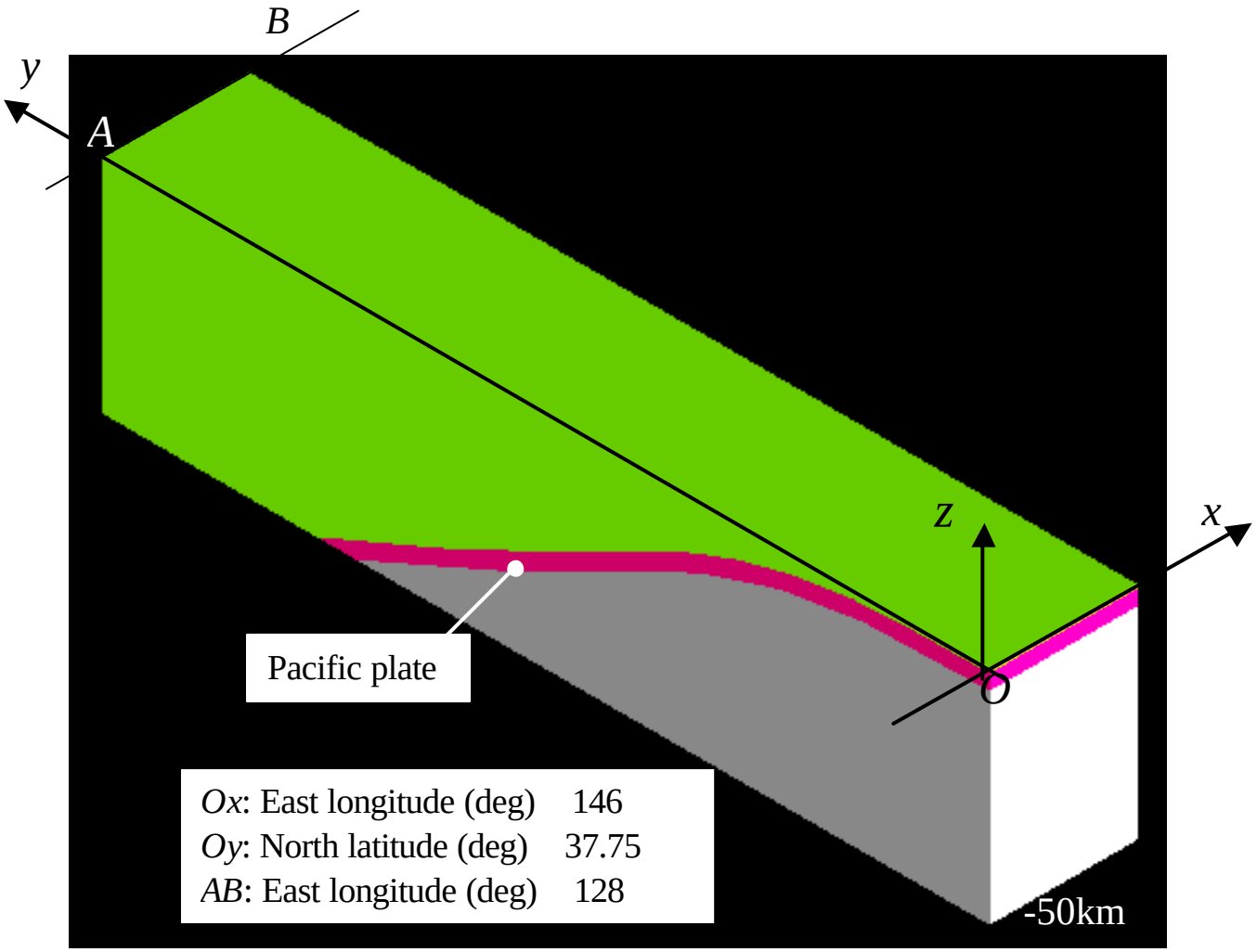
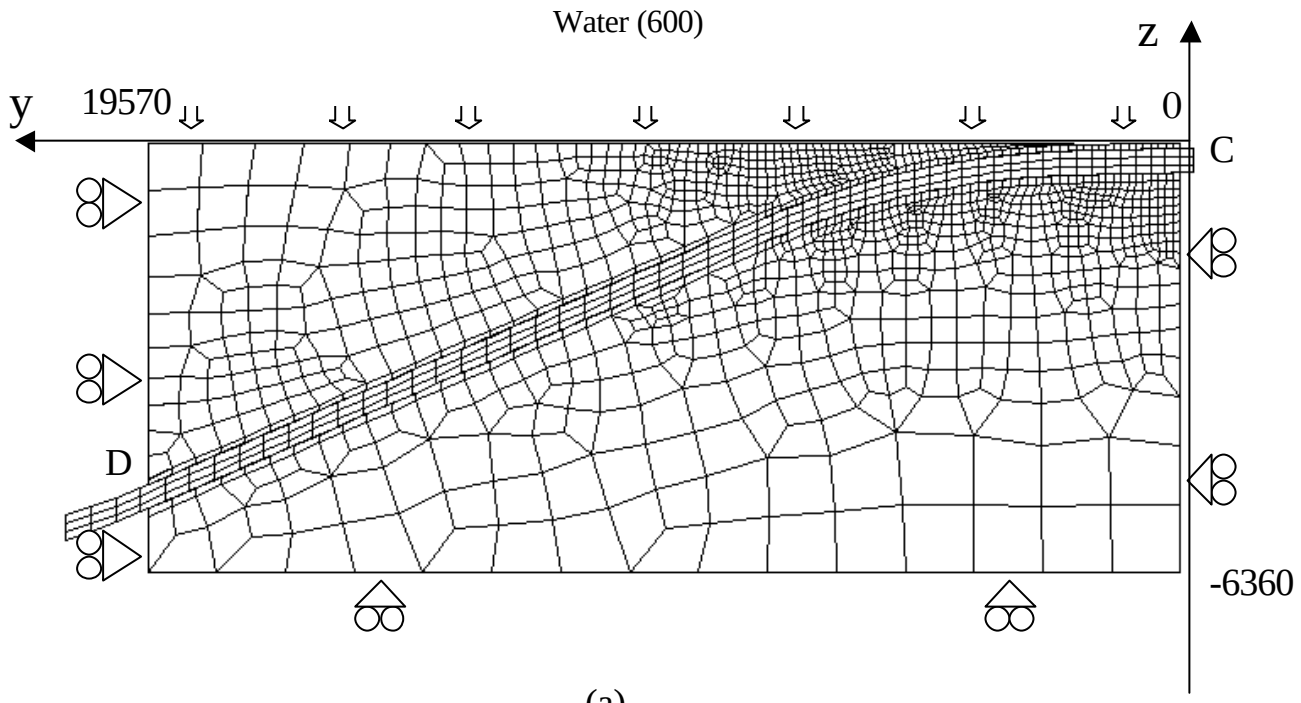
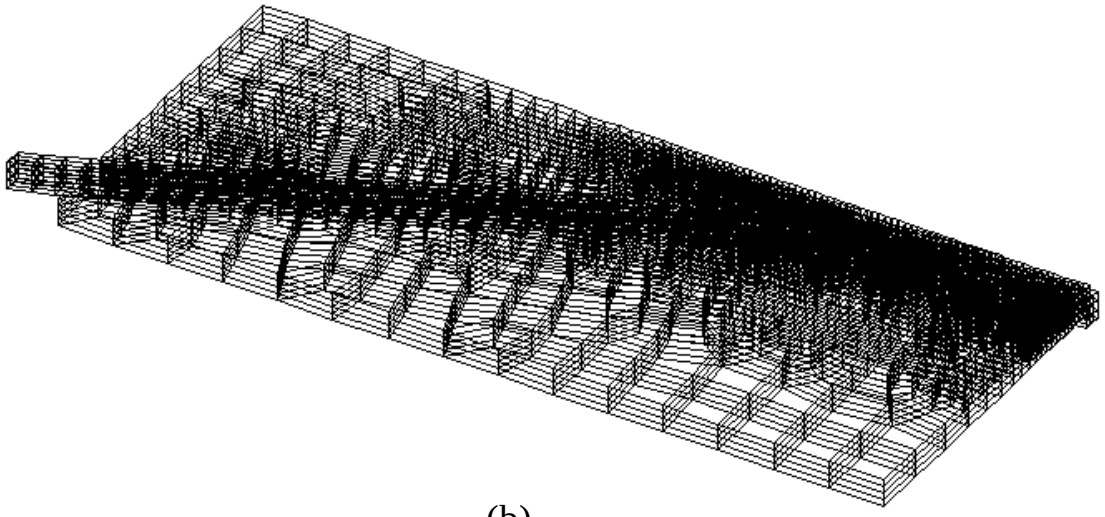


Fig. 8 A part of the tectonic solid model of the Northeast zone of Japan (Kanai, 2000)



(a)

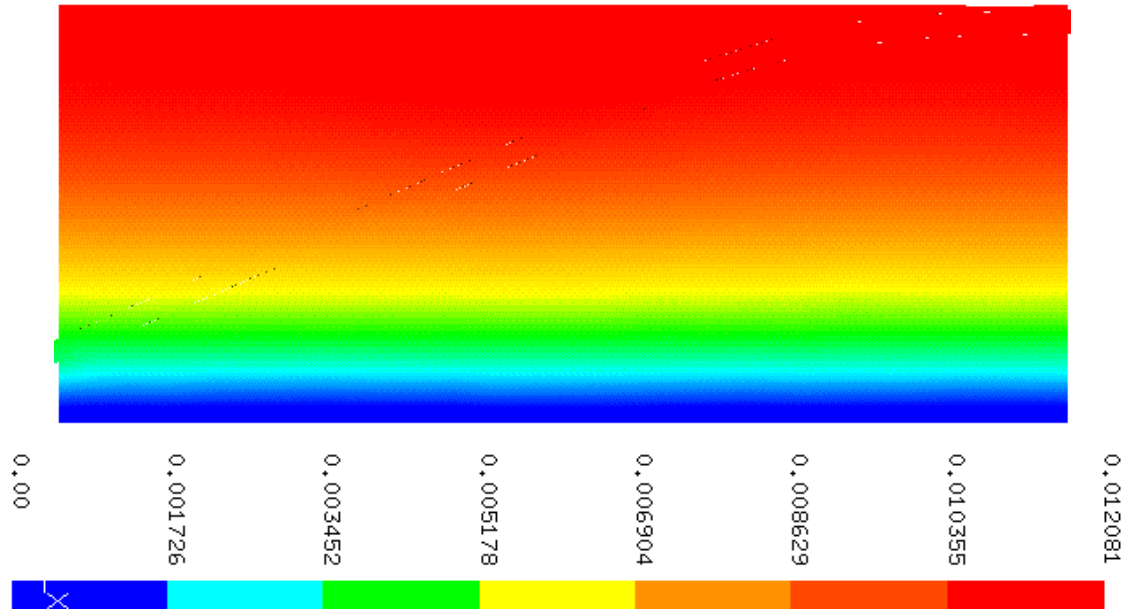


(b)

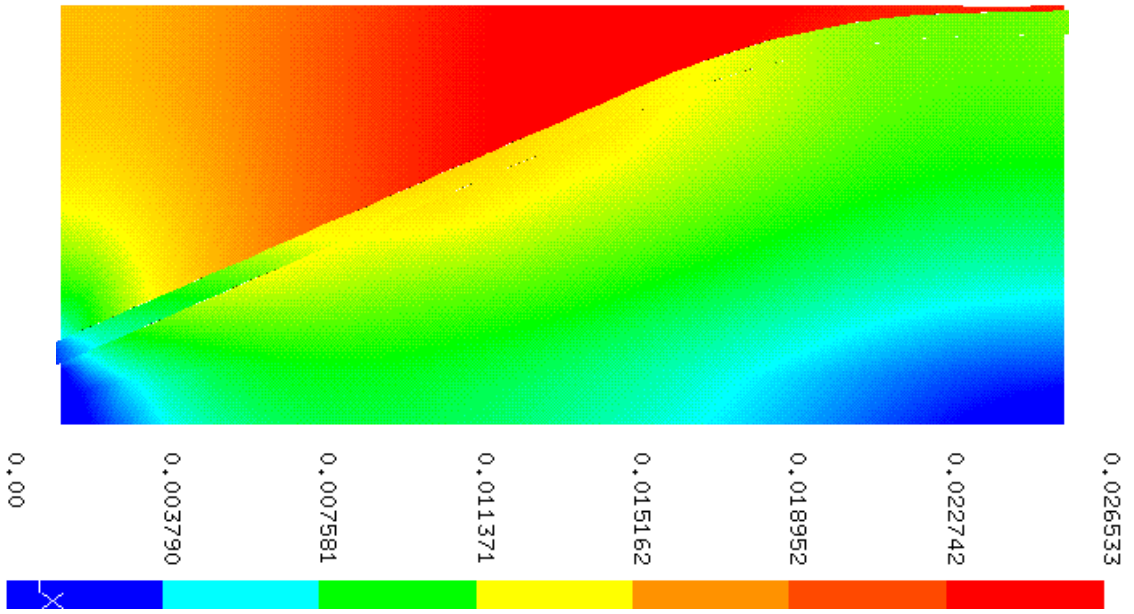
Dimensions: 19570 x 510 x 6360 mm^3

Loading condition: gravity force + hydraulic pressure

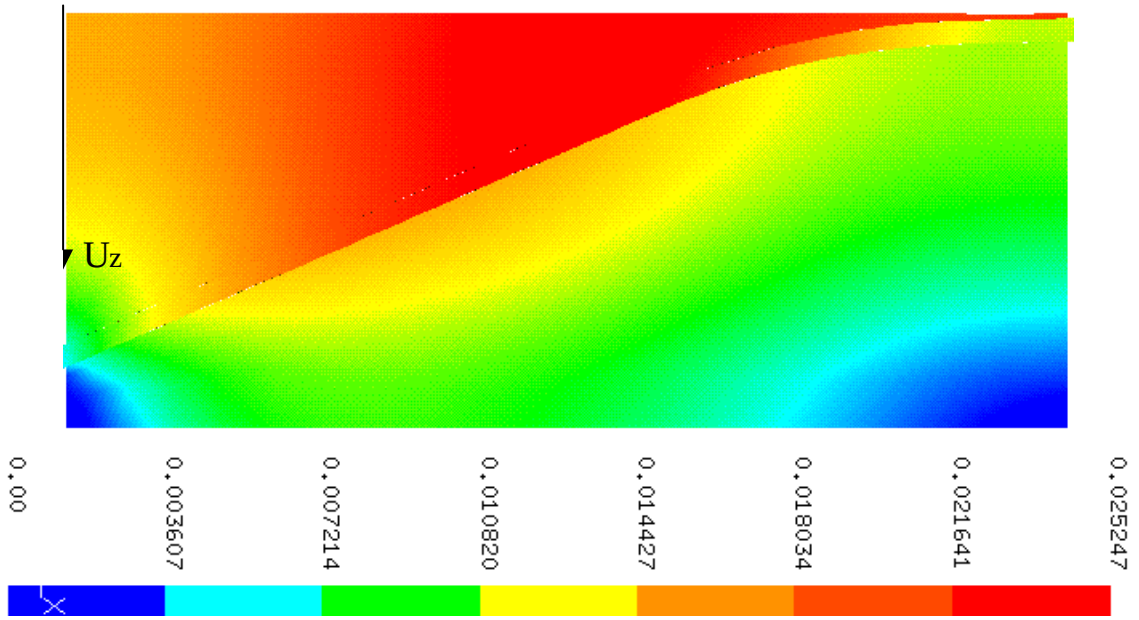
Fig. 9 The mesh used for the Northeast fault model with the Pacific plate in (a) the y-z cross section (along OA in Fig. 8) and (b) the three dimensions


0.00
0.001726
0.003452
0.005178
0.006904
0.008629
0.010355
0.012081

(a)


0.00
0.003790
0.007581
0.011371
0.015162
0.018952
0.022742
0.026533

(b)



(c)

Fig. 10 Displacement distribution at different friction conditions:
(a). $m = 0.5$; (b).$m = 0.3$;

(c). $m = 0.3 (U_z \le 1500 \text{ or } U_z \ge 2780)$, otherwise $m = 0.5 - 0.025 \ln(\tilde{u}_{eq}^{sl} / 0.01)$