Explanation for viscoelastic programs "v2pid.f" and "v2fid.f"

v2pid stands for Viscoelastic, 2 layers, Point source and Internal Displacement. The computer program, v2pid.f, gives viscoelastic response at arbitrary points in the medium, including the earth's surface, and at arbitrary times after the occurrence of a point dislocation. The structure consists of an elastic surface layer and a Maxwell viscoelastic substratum. The parameters needed for computation (e.g., structural parameters, source location, and observation points) are gathered at 3 places tagged by "CHANGE".

Because the solution is expressed in a semi-analytical form, the computation is generally fast and accurate, except for a depth near the dislocation source, at which the solution has a singularity. For a depth near the dislocation source, you can use a response at a slightly different depth (e.g., 100 m), which approximately gives a good solution provided that the computation point is horizontally distant from the dislocation source.

The point dislocation source has a unit fault area (1 km * 1 km). Therefore, if you would like to have a response for a dislocation on a finite fault, you can obtain the solution by summing up the responses due to point dislocation sources that appropriately distributed on the fault plane. For a special case of computation for a finite fault, in which the strike of the rectangular fault is parallel to observation points, you can use "v2fid.f", which stands for Viscoelastic, 2 layers, Finite fault source and Internal Displacement. The solution of v2fid.f is obtained by taking the summation for each fault patch. Note that the accuracy is worse, when a computation point is close to the fault. In this case, you should take a smaller size of fault patches.

When you use the computer program "v2pid.f" and/or "v2fid.f" for your research, including a check of other computer programs, quote the references shown below. However, please use the programs on your own responsibility.

References:

Fukahata, Y. & Matsu'ura, M., 2005. General expressions for internal deformation fields due to a dislocation source in a multilayered elastic half-space, *Geophys. J. Int.*, **161**, 507-521.

Fukahata, Y. & Matsu'ura, M., 2006. Quasi-static internal deformation due to a dislocation source in a multilayered elastic/viscoelastic half-space and an equivalence theorem, *Geophys. J. Int.*, **166**, 418-434.