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(71) Applicant (*for all designated States except US*): EXXON PRODUCTION RESEARCH COMPANY [US/US]; 3120 Buffalo Speedway, P.O. Box 2189, Houston, TX 77252-2189 (US).

(72) Inventors; and
(75) Inventors/Applicants (*for US only*): WILLEN, Dennis, E. [US/US]; 1003 Loire Lane, Houston, TX 77090 (US). MAHER, Louis, J. [US/US]; 4035 Falkirk Lane, Houston, TX 77025 (US).

(74) Agents: KOCH, Stephen, P. et al.; Exxon Production Research Company, P.O. Box 2189, Houston, TX 77252-2189 (US).

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(54) Title: METHOD FOR FREQUENCY DOMAIN SEISMIC DATA PROCESSING ON A MASSIVELY PARALLEL COMPUTER

(57) Abstract

A frequency domain method (figures 3A & 3B) of processing geophysical data on a computer (18) having massively parallel processors (2). The method involves assigning data slice partitions to each processor (46), precomputing a velocity model corresponding to the geophysical data (72), and migrating the data on each slice within each processor using a one-pass, split wave equation finite difference technique for depth migration (50, 54) and either phase shift (230) or recursive techniques for time migration. A sequence of transforms and transpositions (160) between processors assigned partitions on each frequency slice transforms into the frequency-wavenumber domain and allows the migration calculations to be directly performed by each processor to be independent of each other processor. The transforms and transposes also allow for depth migration error correction and filtering (184) in the frequency-wavenumber domain.

