

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
13 April 2023 (13.04.2023)



(10) International Publication Number
WO 2023/059688 A1

(51) International Patent Classification:
G01V 1/28 (2006.01) *G01V 1/30* (2006.01)

(21) International Application Number:
PCT/US2022/045738

(22) International Filing Date:
05 October 2022 (05.10.2022)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/252,675 06 October 2021 (06.10.2021) US

(71) Applicant: **BP CORPORATION NORTH AMERICA INC.** [US/US]; 501 Westlake Park Boulevard, Houston, Texas 77079 (US).

(72) Inventor: **JIANG, Li**; c/o BP Legal Patents and Technology, 501 Westlake Park Boulevard, HOUSTON, Texas 77079 (US).

(74) Agent: **HOOPER, James A.** et al.; Conley Rose, P.C., 777 North Eldridge Parkway, Suite 600, Houston, Texas 77079 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,

(54) Title: METHOD AND APPARATUS FOR IMPLEMENTING A HIGH-RESOLUTION SEISMIC PSEUDO-REFLECTIVITY IMAGE

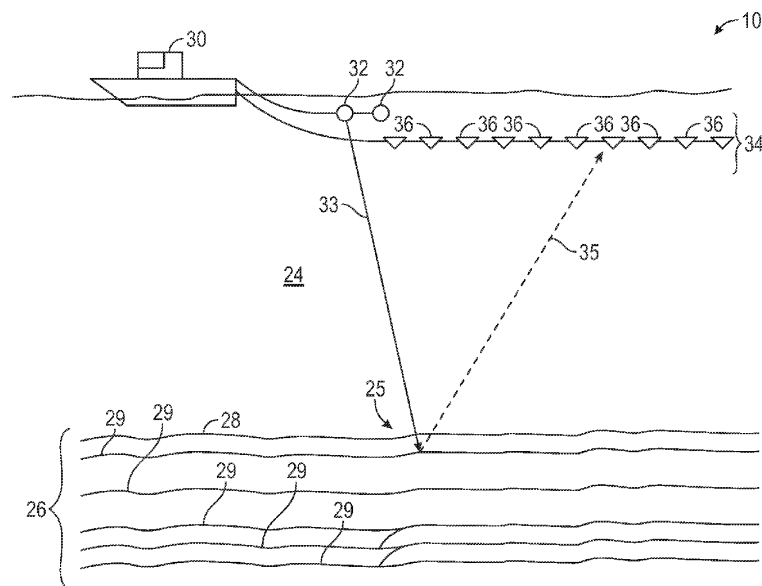


FIG. 1

(57) Abstract: A method for generating a high-resolution pseudo-reflectivity image of a subsurface region includes receiving seismic data associated with a subsurface region and captured by one or more seismic receivers, constructing a velocity model of the subsurface region based on the received seismic data, performing a seismic migration of the received seismic data based on the constructed velocity model to obtain migrated seismic data, computing polarized normal vectors associated with one or more subsurface reflectors of the subsurface region based on the migrated seismic data, and generating a pseudo-reflectivity image of the subsurface region based on both the computed polarized normal vectors.

[Continued on next page]

TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*