geosciences

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Supplementary material

Transient Electromagnetic (TEM) Surveys as a First Approach for Characterizing a Regional Aquifer: The Case of the Saint-Narcisse Moraine, Quebec, Canada

Table S1. TEM stations, with all nearby boreholes and stratigraphic sections, and their associated electrical resistivity values. Depths are identified by parentheses. The blue color in the electrical resistivity column represents the approximate depths at which the water table has been reached. The water table has been determined by 1) in situ observations and 2) use of the piezometric map

TEM stations	Boreholes	Stratigraphic sections	Electrical resistivity (Ohm.m)	Elevation (m)	Water table
L2_ST3	—	**YL071** (0-5) sand and gravel (5-11) fine to medium sand	(0-5) 625-695 (5-11) 465-625	ST3: 137 YL071: 137	11
L3_ST1	**F1-PACES** (0-6) medium to coarse sand (6-12) fine to medium sand with silt and clay (12-46) clay		(0-6) 350-405 (6-12) 110-350 (12-46) 15-110	ST1: 114 F1-PACES: 114	No water
L6_ST5	—	**YL057** (0-3): sand and gravel	(0-3) 610-620	ST5: 120 YL057: 120	No water
L6_ST7	—	**YL019** (0-9): sand and gravel with boulders	(0-3) no data (3-9) 430-745	ST7: 120 YL019: 123	No water
L7_ST1	—	**COMP016-18** (0-11): sand and gravel with pebbles and boulders (11-16): medium to coarse sand (16-18): fine to medium sand	(0-11) 460-720 (11-16) 345-460 (16-18) 170-330	ST1: 139 COMP016-18: 139	18
L9_ST5	**ME1843** (0-13): fine to coarse sand and gravel (13-27): sand (27-30); gravel and clay (till)	—	(0-13) 540-910 (13-27) 215-540 (27-30) 200-215	ST5: 180 ME1843: 180	Not available in situ
L10_ST1-2	**MAUR0345** (0-19): sand and gravel	—	(0-14) 400-835 (14-19) 250-400	ST1-2: 140 MAUR0345: 140	14
L10_ST5	—	**YL080** (0-12): fine to coarse sand	(0-12) 380-550	ST5: 146 YL080: 146	14
L13_ST1	**ME0704** (0-8): sand and gravel (8-19): sand and gravel with clay (19-27): clay	—	(0-8) 150-230 (8-19) 60-150 (19-27) 40-60	ST1: 118 ME0954: 118	1-2
L13_ST3	**P12** (0-9): sand	—	(0-9): 110-150	ST3: 118 P12: 118	1-2
L15_ST1	**ME1615** (0-13): sand and gravel (13-38): sand and gravel with clay (38-50): sand and gravel		(0-3): 360-390 (3-13): 165-360 (13-38): 80-165 (38-50): 150-285	ST1: 115 ME1615: 114	2-3
L17_ST1	**ME0954** (0-8): sand and gravel (8-13): sand and gravel (13-17): sand (17-27): sand with clay	—	(0-2): no data (2-8): 300-415 (8-13): 180-300 (13-17): 110-180 (17-27): 60-110	ST1: 116 ME0954: 118	8

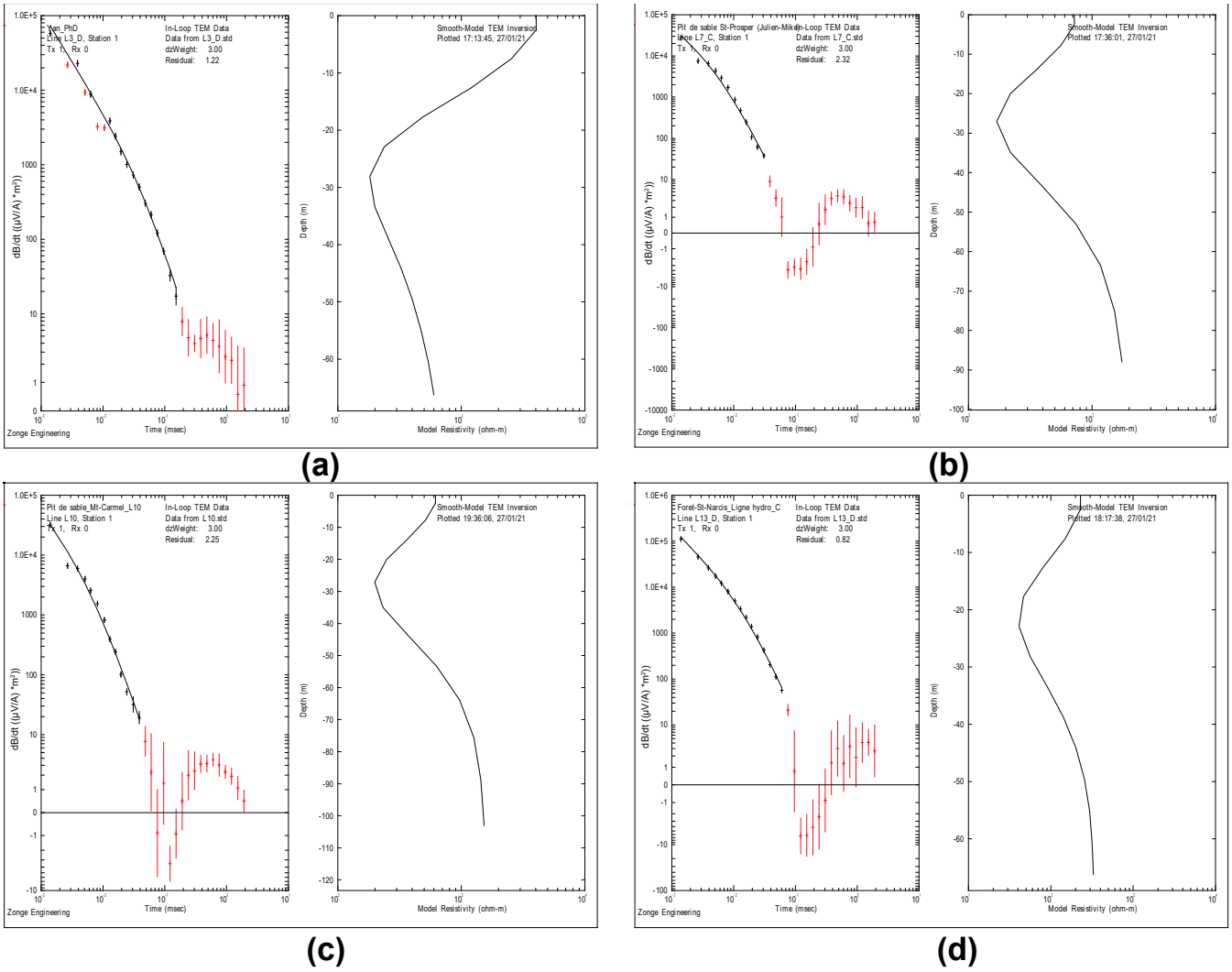

Figure S1. A. Left: Typical induced voltage decay from Line 3 (L3), Station 1. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 10 μV/A. The inversion residual is 1.22. **B. Left:** Typical induced voltage decay from Line 7 (L7), Station 1. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 10 μV/A. The inversion residual is 2.32. **C. Left:** Typical induced voltage decay from Line 10 (L10), Station 1. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 10 μV/A. The inversion residual is 2.35. **D. Left:** Typical induced voltage decay from Line 13 (L13), Station 1. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 25 μV/A. The inversion residual is 0.82. **Right for Figure S1A-D:** The obtained smooth model TEM inversion.

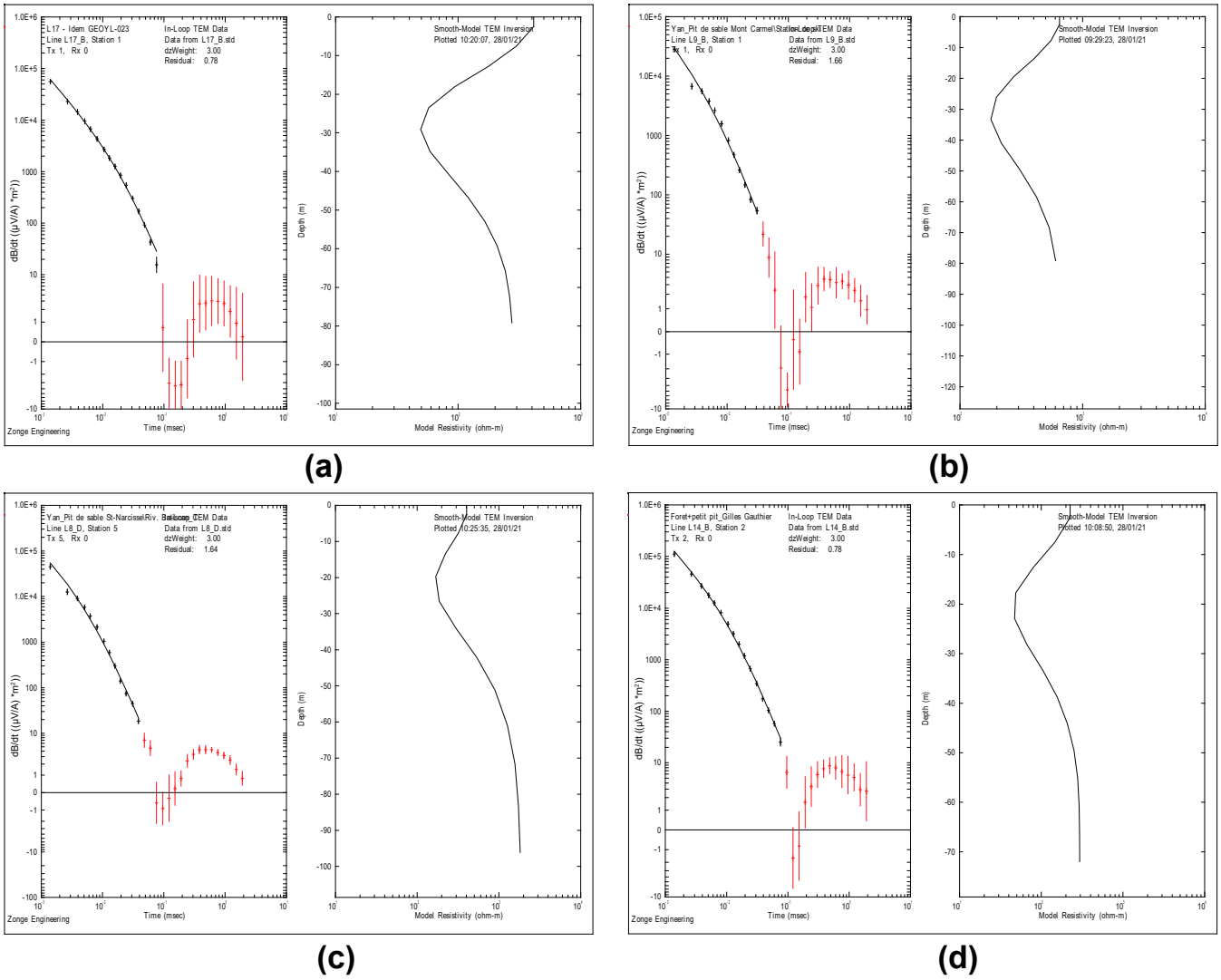

Figure S2. A. Left: Typical induced voltage decay from Line 17 (L17), Station 1. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 8 μV/A. The inversion residual is 0.78. **B. Left:** Typical induced voltage decay from Line 9 (L9), Station 1. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 30 μV/A. The inversion residual is 1.66. **C. Left:** Typical induced voltage decay from Line 8 (L8), Station 5. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 9 μV/A. The inversion residual is 1.64. **D. Left:** Typical induced voltage decay from Line 14 (L14), Station 2. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 10 μV/A. The inversion residual is 0.78. **Right for Figure S2A-D:** The obtained smooth model TEM inversion.

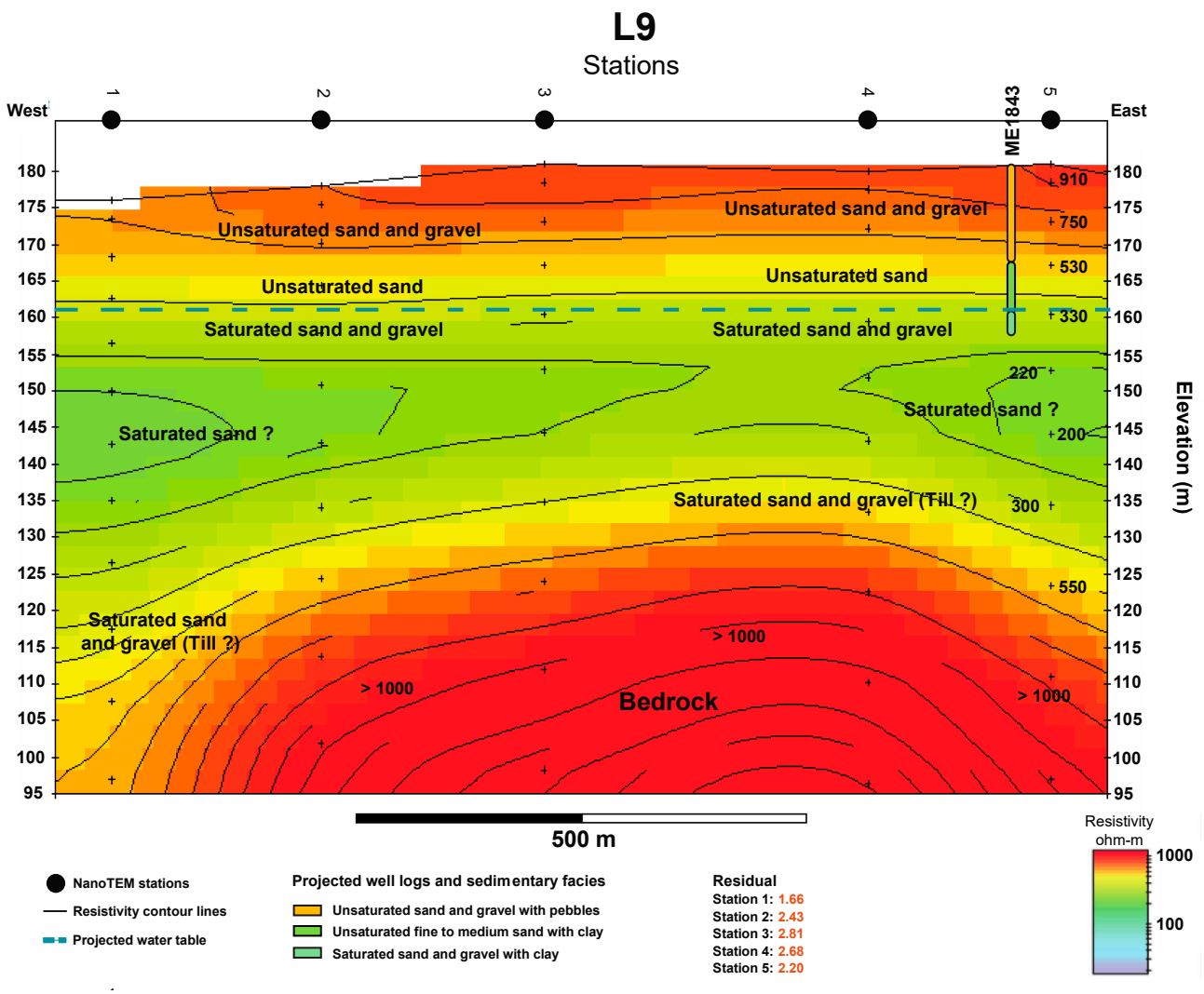

Figure S3. Interpreted 2D Section L9 and borehole ME1843 near Notre-Dame-du-Mont-Carmel, Quebec. The surface deposit elevation is obtained from lidar data. The blue dashed line represents the projected water table, and all direct observations have been acquired in the field.

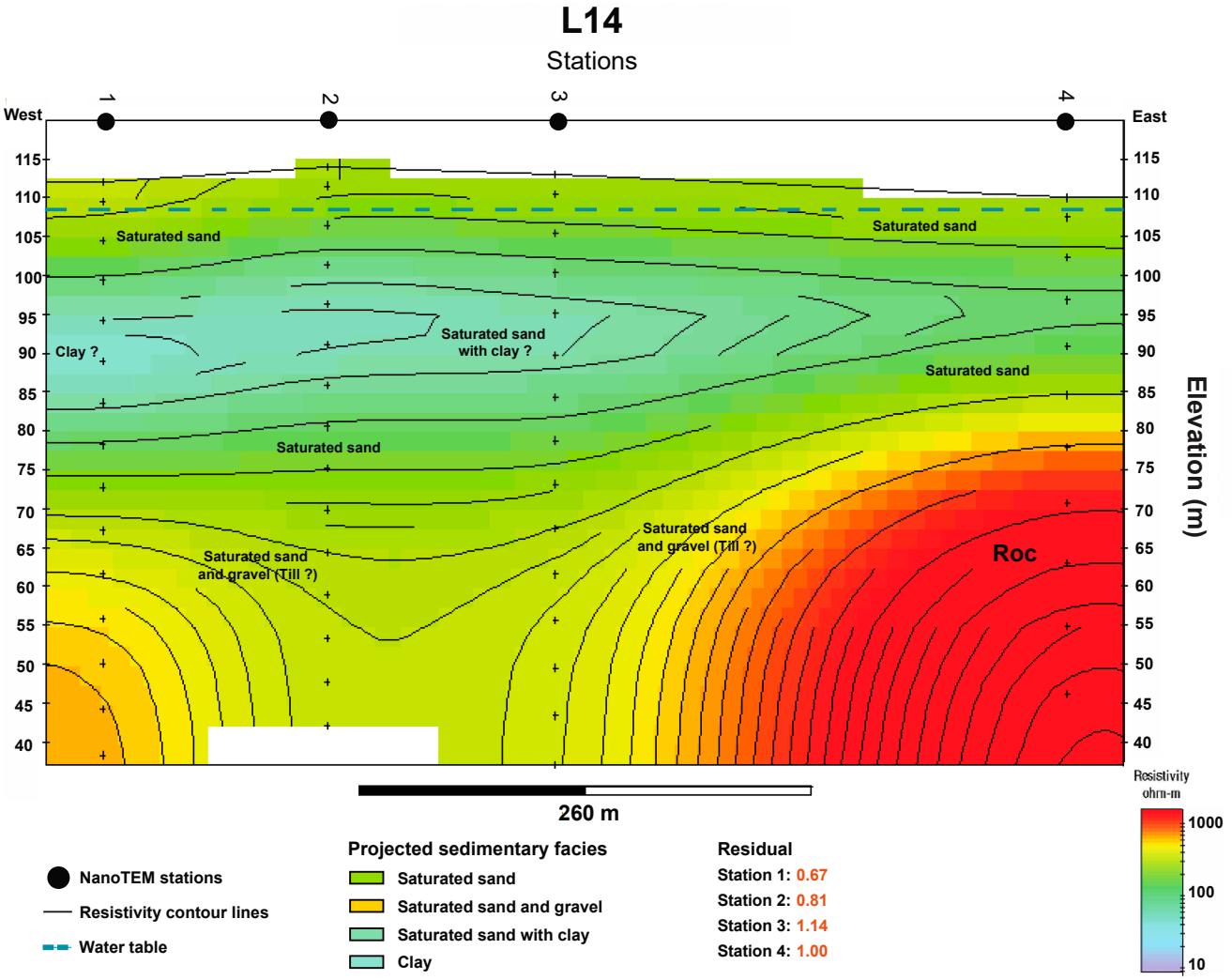

Figure S4. Interpreted 2D Section L14 near Saint-Narcisse, Quebec. The surface deposit elevation is obtained from lidar data.

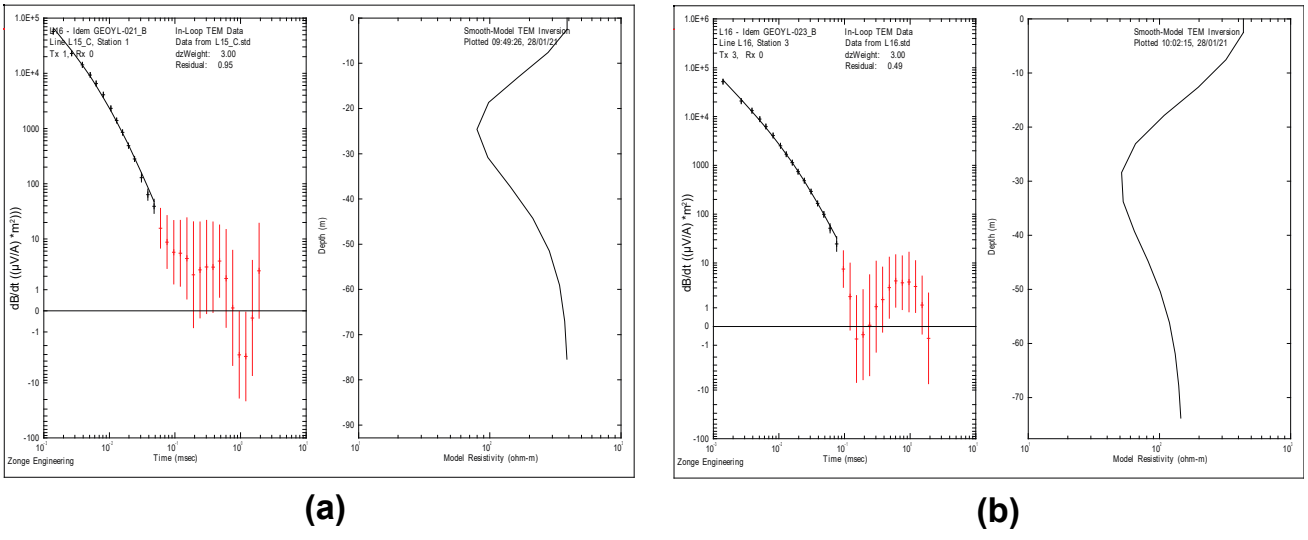

Figure S5. A. Left: Typical induced voltage decay from Line 15 (L15), Station 1. Measured data are shown as crosses and inversion fitting as a black line. Noise level is approximately 30 μV/A. The inversion residual is 0.95. **B. Left:** Typical induced voltage decay from Line 16 (L16), Station 3. Measured data are shown as crosses and inversion fitting as a black

line. Noise level is approximately 15 μV/A. The inversion residual is 0.49. **Right for Figure S5A-B:** The obtained smooth model TEM inversion.

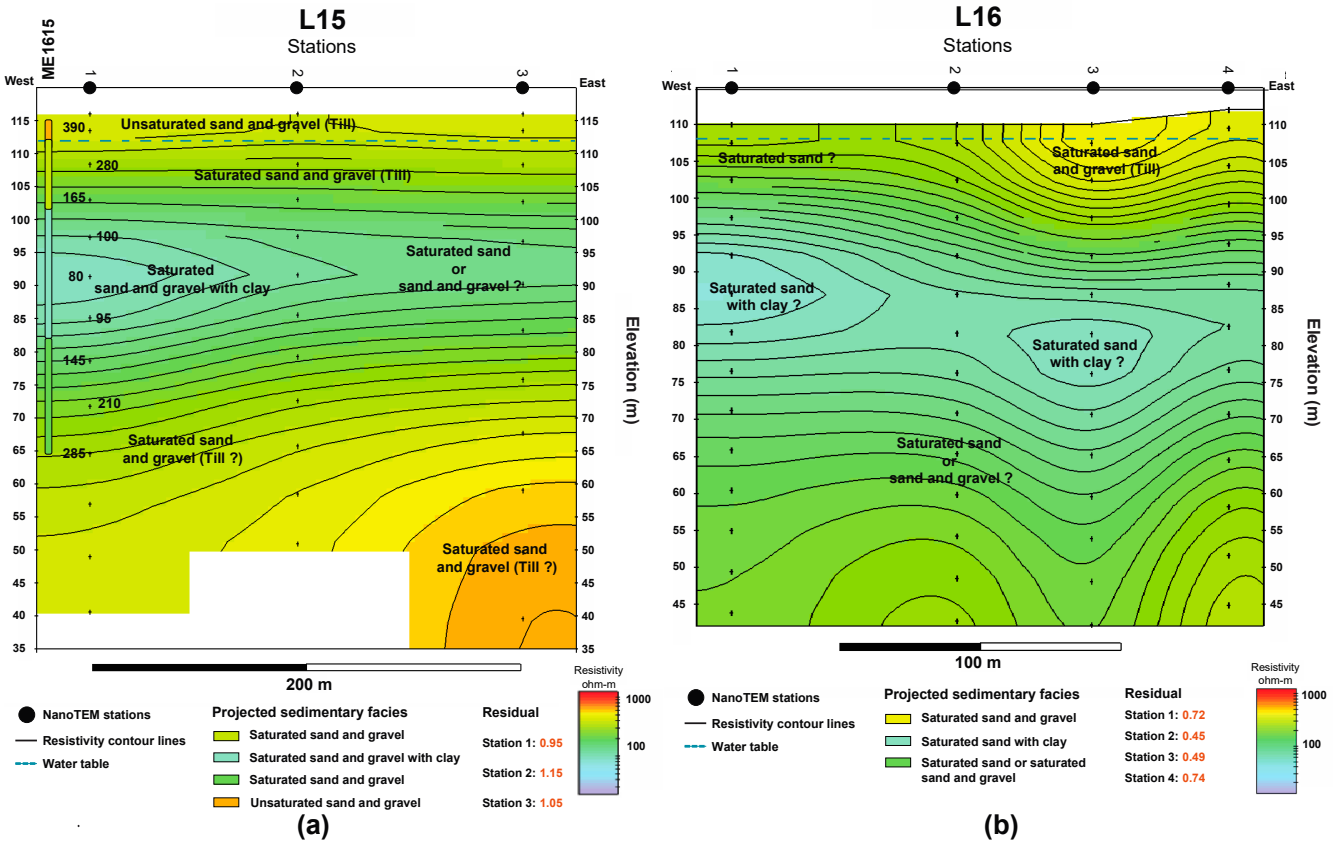

Figure S6. A. Interpreted 2D Section L15 near Saint-Narcisse, Quebec. **B.** Interpreted 2D Section L16 near Saint-Narcisse, located approximately 300 m further south of L15. The surface deposit elevation of both sections was obtained from lidar data.