Appendix C: Symbols Used in Geophysical Exploration

The following symbols are recommended for publications of the SEG. Additional symbols used in well logging and mathematics are listed in Appendices D and E. Symbols are generally bold face when they indicate vector quantities.

a	Apparent (as a subscript); velocity gradient with depth; year.
A	Area.
AMT	Audiomagnetotelluric.
b/B	Magnetic induction in time/frequency domain.
c	Velocity (of light); seismic velocity.
C	Capacitance $= Q/V$.
d/D	Electric displacement in time/frequency domain.
d_s	Depth of source/shot.
e	Base of natural logarithms.
E	Young's modulus; elevation; voltage (EMF).
e/E	Electric field strength in time/frequency domain.
EM	Electromagnetic.
F	Magnetic vector potential.
f,F	Frequency; fair (reliable but with less accuracy/certainty than desirable); function.
FE	Frequency effect.
FEM	Frequency-domain electromagnetic.
g	Acceleration of gravity.
G	Conductance.
G, **G**	Scalar/tensor Green's function.
h	Thickness.
h/H	Magnetic field strength in time/frequency domain.
I	Current (scalar).
I	Intensity of magnetization (a vector); current vector.
i,j	$(-1)^{1/2}$.
i, j, k	Unit vectors in the x-, y-, z-direction.
IP	Induced electric polarization.
J	Free charge current density (a vector).
k	Bulk modulus; susceptibility.
K_e	Relative dielectric permittivity $[K_e = 1/(4\pi\epsilon_0)]$.
K_m	Relative magnetic permeability $[K_m = (\mu_0/4\pi)]$.
L	Inductance; area over a decay curve; length.
m	Volume chargeability.
M	Mutual inductance, integral chargeability.
m, M	Magnetic polarization in time/frequency domain.
MF	Metal factor.
MIP	Magnetic induced electric polarization.
MMR	Magnetometric resistivity.
MT	Magnetotelluric.
n	Unit normal vector.
n	Index of refraction.
p	Raypath parameter; pressure.
P	Polarization; dipole moment/volume; poor (probably reliable with poor accuracy); pressure.
PFE	Percent frequency effect.

P, P	Magnetic polarization in time/frequency domain.
q	Charge.
Q	Heat-flow rate.
r	Position vector.
r	Radial distance.
R	Resistance; reflectivity (reflection coefficient); radius.
s	Laplace transform variable.
S	Admittance $=1/Z$; surface.
t	Time; traveltime.
T	Period; temperature; age; transmission coefficient.
TEM	Time-domain electromagnetic.
$\mathbf{u}_x, \mathbf{u}_y, \mathbf{u}_z$	Unit vectors in Cartesian coordinates (or **i, j, k**).
$\mathbf{u}_\rho, \mathbf{u}_\theta, \mathbf{u}_z$	Unit vectors in cylindrical coordinates.
$\mathbf{u}_r, \mathbf{u}_\theta, \mathbf{u}_\phi$	Unit vectors in spherical coordinates.
U	Group velocity; magnetic scalar potential.
v, V	Velocity; phase velocity; volume
V	Voltage; electric or gravity scalar potential.
vp, VP	Very poor (in both reliability and accuracy).
w_x	Weathering.
x	Offset distance; distance.
X	Reactance; $X_C = 1/(2\pi v C)$; $X_L = 2\pi v L$.
y	Admittance.
z	Depth
z^n	Time delay of n units.
Z	Impedance.

α	alpha	P-wave velocity; proportional to; attenuation factor (seismology), propagation constant (electromagnetic), phase constant; α-particles.
β	beta	S-wave velocity, β-particles, attenuation constant (electromagnetic).
γ	gamma	Skewness; gyromagnetic ratio; unit of magnetic field strength; phase angle; gravitational constant; gamma ray.
δ	delta	Impulse ($\delta(t)$ or δ_t); logarithmic decrement; skin depth; depth of penetration.
$\tan \delta, \tan \delta_m, \tan \delta_{em}$		Dielectric, magnetic, electromagnetic loss tangent.
Δ	Delta	Difference; dilatation; skin depth or attenuation length.
ϵ	epsilon	Permittivity; eccentricity.
η	eta	Overvoltage; absorption coefficient.
θ	theta	Angle; induction number.
θ_c	Theta	Critical angle.
κ	kappa	2π (wavenumber) $= 2\pi/\lambda$.
λ	lambda	Wavelength; coefficient of anisotropy; Lamé's constant.
μ	mu	Magnetic permeability $= B/H$; micro; Lamé's shear modulus; damping factor, attenuation constant (radiometric); viscosity.
ξ	xi	Dip.
ρ	rho	Density; electric resistivity; radius of curvature; radial distance, charge density.
σ	sigma	Poisson's ratio; electrical conductivity; standard deviation; stress.
τ	tau	Time delay; damping factor.

ϕ	phi	Porosity; flux; correlation function; latitude.
χ	chi	Magnetic susceptibility.
ψ	psi	Wave function.
ω	omega	Angular frequency.
Ω	Omega	Ohm.
∇	Del.	Gradient operator (a vector).
$*$		Convolution operator.