Index

A
Abbot’s Cliffs: 259, 266–270, 291
Abele, Gerhard: 86, 240–245, 248, 252, 254
acoustic emission effect. See noise
acoustic-fluidization hypothesis: 398
Adda River: 72, 79, 245–248
Agua Blanca fault: 380m
air blasts
Happy Isles: 184–188
Liberty Cap: 174–176
Mount Cook: 50
Río Colorado: 143–144
Val Pola: 82
Akimoto Lake: 220–221
Alaska: 49, 248. See also Augustine volcano
Alberta. See also Rocky Mountains
depositional RORs: 339–340
glacial erosion: 339
geology of: 325–329
morality activity of: 329–332
structural RORs: 340
studies in: 325–342
Alfalfa hydroelectric plant: 20–21, 135–136, 140–147
allochthonous deposit: 228
alluvial-fan deposits
age of facies: 380
composition of: 385
decapitated stones in: 391
deposition of: 382m, 383f
paleogeographic reconstruction of: 383–384
settlement sitting on: 8, 305
in source: 75, 151
subjacent to megabreccia: 385
Alpine fault: 36m, 39
Alps
climate of: 254
forests, destruction of: 253–254
glacial of: 243
hazard evaluation: 253–254
incidence level: 241–243
mining in: 253
morphology of: 243
structural RORs: 341
Alverson Andesite: 380, 383f
Amaluzu Dam: 11–12
American River: 176–179
amphibolite: 387
amphibolite: 72, 248
Andes Mountains
edifice collapses in: 210
precipitation: 146
precipitation in: 1
seismicity of: 1
studies in: 1–25, 135–148, 303–323
topography of: 303
volcanic activity in: 4–8, 225
andesite
in source: 138, 139m, 312
in volcanoes: 220, 223, 225
anhydrite: 384, 387
anticline
formation of: 311
Laurel: 125
Livingstone: 339
Antofagasta: 21–23
Anza Formation
age of facies: 380
conformity of deposits: 382m
glacial of: 380
megabreccia: 382m, 383f
morphology of: 380
stratigraphic divisions: 383f
Anza-Borrego Desert State Park: 379–399
Anzac Peaks: 43, 49
aplite: 72
Aquilone: 82, 247
Araracuare: 312–318, 321
arenite, marine: 383f
Argentina
seismic activity in: 310–311
studies in: 23–25, 303–323
topography of: 303
argillite: 39, 67
Armero: 8
Arth-Goldau: 237
Asian plate: 345
Augustine volcano
edifice collapses in: 210
edifice restoration: 211
grain-size analysis: 218
lateral blast from: 231
studies of: 223–225
tsunami: 224
Australian plate: 39
Austria
limestone pinnacles in: 341
studies in: 237–254, 248, 250, 252
b Breccia
crackle: 351, 363, 367
fault: 319
megabreccia. See megabreccia
mosaic: 351
tuff: 308
in Volcanic Complex: 308, 312, 312–315
Brenda Mine: 48
British Columbia: 191–208. See also Rocky Mountains
brittle material. See also Bishop's brittleness index
in block-slip event: 311
coal mine waste piles: 194, 200
folded slabs: 316
fracturing of, by stress: 226
Sale Mountain rocks: 154
braving of clast edges: 67
Bualtar Glacier: 347–348, 373
buckler: 312
balking
debris flow factor: 295–296
negative, in chalk: 292
from substrate scouring: 215
in Volcanic Complex event: 314
Burns Creek: 119
Burrell Creek: 119
Butano fault: 121
Butano sandstone: 121, 125
C
calcareous quartz schists: 4
calcareous sandstone: 20, 139m
Calchaquense: 307–318
California
Loma Prieta earthquake: 117–133
Cambrian Elko Formation, Middle: 339–340
Cambrian Flathead Formation: 340
Cambrian Gordon Formation: 340
Cana de Azucar: 4
Canada: 48, 64, 191–208, 325–342
Canabrake Conglomerate: 383f
Cap Blanca: 281–282, 289
Cap de la Hève: 297
Caracas: 3–4
carbonate sediments: 243
Carboniferous-Cretaceous graywacke: 39
caroming: 357
Castellaccio: 82
catastrophic, definition of: 1, 241
Cathedral Peak Granodiorite: 168
Cenozoic: 165, 308f
Cerro Condor-Seneca: 12–15
Cerro Prieto fault: 380m
Cerro Quemado volcano: 231
Cerro Rabilcano: 21, 135, 138, 145–146
chalk
bulk factor: 295
characteristics of: 289
definition of: 257, 259
glacial of: 297
hardness classification: 258, 292
hydrogeology of: 293–294
pile-driving of: 292

f—figure; m—map; p—photograph; t—table
Dieppe: 279–280
dikes
clastic: 216–217, 228
pegmatite: 387, 394
dilation of material
during emplacement: 228
rock-mass deformation: 67, 77
in Southern Alps (New Zealand): 39
diorite
in Mount Zandia: 72, 77
in Rio Colorado watershed: 139m
in Slide Mountain: 168
in Val Pola debris: 72, 77, 82
dip
in carbonate sediments: 243
in Cerro Ribacano: 138
in Continental Range bedrock: 193
daylighting in cuts: 4
en echelon faults: 308
fault rupture: 121
of lava and pyroclastic materials: 210
in Liberty Cap: 174
listric faults: 307
in Lo Valdes Formation: 20–21
of Mount Cook bedrock: 39, 43
of Mount Fletcher bedrock: 39, 54
of Mount Thomson bedrock: 39
in Mount Tsao-Ling rock formations: 92, 105
in Rio Damasa Formation: 20–21
in Rocky Mountains: 337
in sale Mountain Neogene strata: 153, 155
in slope-stability modeling: 64
in taphra layers: 212
underdip slopes: 335
in Villa Del Monte bedrock: 125
in Villavil events: 312–318
in volcanic edifice failure: 211
dolomite, Proterozoic: 340
dolostone: 337–339
domain: 394
Donne Glacier: 62, 67
Dover, Great Britain: 271–272, 297
Dronningestolen: 283–284
Dulung Bar: 367
dust cloud
Estero Parraguire: 138
Happy Isles: 184
Mount Cook: 47
Mount Fletcher: 59
Rio Colorado: 143–144
Val Pola: 82
d E
earthflow: 334
earthquake
ground cracks from: 125
modeling of: 97–98
from tectonic processes: 383
trigger mechanism: 1
on Cerro Ribacano: 135, 145
on Mount Tsao-Ling: 92, 97–98
in Reventador region: 10–11
in Rinhue: 19
in Rio Paez watershed: 8

in Summit Ridge area: 117–133
on Unzen volcano: 222–223
volcanic structural failure: 210
in Val Pola region: 75
echelon cracks: 125
Ecuador
Guagua Pichincha volcano: 230
studies in: 10–12
Egmont volcano: 210
Elbe: 250
Ekofisk Oil Field: 292
El Almalfi hydroelectric plant: 20–21, 135–136, 140–147
El Capitan Granite: 183
El Jarilla: 308
El Limon: 4
El Niño: 23
El Progreso: 4
Etna: 237, 253, 359–363
Eltono fault: 380m
emplacement of deposits: 367–373
Empress Glacier: 64
energy line model: 240
Engelberg: 243
epidote: 387
erosion
in Canadian Interior Plains: 329
glacial: 66. see also glacier
glaciofluvial: 337
gravitational collapse
Mount Zandia: 77
Southern Alps (New Zealand): 67, 68
volcanic edifices: 210
headward: 17
marine: 210
in modeling: 65
permafrost loss and: 248
riverside
Cerro Condor-Seneca: 12–15
Ching-Shui River: 92, 105–109
Mayurnarca: 17–19
Estero Parraguire. See also Rio Colorado climate of: 136, 146
conformity of deposits: 136
geology of: 138
material composition: 138–140
morphology of: 136–138, 144–145
precipitation: 136, 146
studies of: 20–21, 135–148
topography of: 136
trigger mechanism: 135–136, 145–146
velocity of material: 138–140
volume of material moved in: 136, 140
Eurasian continental plate: 91
European chalk deposits: 257–259
exfoliation sheets: 167, 184
extension, zones of: 132, 317

F
facies
age of: 380
block: 216–218, 225–228
greenschist: 39
lair: 218, 228
matrix: 216–218
mixed: 216–218, 225–228
modeling of: 384
prehnite-pumpellyite: 39
pumpellyite-actinolite, semischistose: 39
fabrics
of coal waste piles: 203
data used for: 160
definition of: 203, 240
in modeling: 66
of Sale Mountain: 160–161
topography impact on: 244, 356
use in modeling mobility: 66, 160
of Val Pola: 86
volume of material, impact of: 244
fald: 283
fan-delta deposits
diffractograms: 391
geochemical analysis of: 390
subjacent to megabreccia: 392
superjacent to megabreccia: 385–386
fanglelomere
megabreccia deposit as: 384, 392
stratigraphic deposition of: 383f
fault
bedding-plane: 314–315, 318–319
discontinuous surface rupture: 117
en echelon: 308
listric: 307
reverse: 155
oblique: 39
in Rocky Mountains: 329
stress state determination: 155
strike-slip: 59
transgressive: 312, 316, 318–320
feldspar: 391, 394
Feng-Tzu-Lan syncline: 92
Fenmay: 243
Fish Creek Gypsum
deposition of: 382m
origin of: 383
paleogeographic reconstruction: 383–384
stratigraphic deposition of: 383f
subjacent to megabreccia: 392
superjacent to megabreccia: 385
Fish Creek Mountains
map of: 381m
Miocene subaerial deposits: 384–392
paleogeographic reconstruction: 383–384
Pliocene submarine deposits: 392–397, 398
Fish Creek-Vallecito basin
age of deposits: 380–382
geology of: 380
map of: 380m, 381m
morphology of: 380
floods: 47
Flathead fault: 329
Flaxville-Blackfoot surface: 329, 341
Fletcher, Mount
goil of: 54
hazard evaluation: 68
historical events: 64
material proportions: 54–57
morphology of: 54, 59
vs. Mount Cook: 54

f—figure; m—map; p—photograph; t—table
physical setting: 54
seismic activity: 57, 67
studies of: 35–39, 54–61, 64–66–69
velocity of material: 59
volume of material moved at: 54, 57
wave, water displacement: 59–61
flexure: 312
Faults
flow separations: 367
interpretation of deposits: 248–252
shear zones at depth: 367
volume of material moved in: 243
flows: 283
flood. See also lahars; wave, water displacement
from dam collapse
on Ching-Shui River: 92–96
on Hunza River: 347
on Indus River: 347
in Rio Limon watershed: 4
on Rio Mantaro: 12–15, 17–19
on Rio Pata: 11–12
on Río San Pedro: 19–20
on Rio Santa: 12, 15
vs. debris flow: 23
of Ophir Creek: 179
in Valtellina: 82, 247
flow
laminar: 212, 244–245
turbulent: 67–68, 244–245
velocity gradient: 392
flow separations: 367
Fold
after megabreccia injection: 392
asymmetrical: 312
axial orientation: 397
isoclinal: 54
overturned: 136
synform: 314–317
synclinal vergence: 397
Foliano: 82
foliation: 4
Folstone Warren
bulking of: 295
flow debris material: 291
pore-water pressure: 292–293
studies in: 265–266
studies of: 291
Foothills: 326, 335, 337, 341–342
forests: 119, 253–254
Franke
glacial erosion impact: 339
morphometry of: 337–338
volume of material moved in: 335
freeze-thaw process
Cerro Rabicano: 136, 146
in coal waste piles: 197
definition of: 183
Friden Glacier: 62, 67
Fugen-dake volcano: 222
G
gabbro: 72, 82, 85
Gabbro di Sondalo: 72, 77
gabbrodiorite: 72, 77
Galuungung: 228
Gannan Chish: 367, 373
Garfield Creek: 170
gas reservoirs: 297
geochemical analysis of
Cerro Rabicano: 146
megabreccia: 388–391, 394–397
geochemical properties: 4
Germany
Alpine studies in: 237–254
chalk studies in: 258–259, 284–289, 294, 297
Schorfen mountain: 240
Gibson, Mount: 168–169
glacier
catastrophic failure in: 15
creek: 66
deposit characteristics: 67, 304
demographic evidence, destruction of: 88
glacioclastic sediments: 19, 326, 337
Laurentide ice sheet: 337
montane glaciation: 329–332
moraine deposits: see morainal deposits
outwash from: 19
recession
in Alberta: 335–339, 341–342
in Alps: 77, 86, 244
in Andes Mountains: 138, 146
in Continental Range: 193
in Crowsnest River valley: 339
as dating tool: 250–251
from Karakoram Himalaya: 348
lakes from: 68
in Rocky Mountains: 335–339, 341–342
in Sierra Nevada range: 167, 184
in Southern Alps (New Zealand): 67, 68
as trigger mechanism: 248, 251
rock–mass deformation, see deformation
runout on to: 49, 248
sapping process role: 340
till from: 19
Tioga glaciation: 168–169, 174
Wisconsin ice age: 329–332
Würm glaciation: 77, 86
Gmunden: 341
gneiss: 72, 245, 248
Gol-Ghoro: 363
graben: 215, 317
grading
in deposits: 218
in Esteros Parguaire deposits: 144
in subaerial megabreccia: 388
photographic analysis of: 388
reverse: 385
upward: 251
Grand Plateau: 39, 47, 49–52
granite
in American River dam: 176
in megabreccia: 387, 394
in Slide Mountain: 168
in Volcanic Complex: 312
granite gneiss: 25
granitic rock: 166, 172, 176
granodiorite
Cathedral Peak: 168
Cretaceous: 179
dehis dust cloud: 388
Glacier Point: 184–188
Half Dome: 169, 174, 183, 184–188
in megabreccia: 387, 394
Mesozoic: 176
Middle Brother: 181
in Mount Zandila: 72, 77
Sentinel: 173
source material: 15
Cerro Condr-Seneca: 12
graywacke
Carboniferous-Cretaceous: 39
in lithological trains: 67
nonschistose: 39
Great Britain. See also specific locations
chalk
comparison of: 294
hardness classification: 259–260
hazard evaluation: 297
porosity: 289
London earthquake: 272
studies in: 257–274, 289–299
greenschist facies: 39
grooves, flow indication: 391–392
Grosins Valley: 72
ground cracks from: 125
Guagua Pichincha volcano: 230
Gulf of California rift basin: 380
Gunung Gadung: 227–228
gypsum. See also Fish Creek Gypsum
Cerro Rabicano: 138
dissolution of: 146
hydrothermal precipitation: 384, 387
in Lo Valdés Formation: 139
H
Haldi: 367
Half Dome Granodiorite: 169, 174, 183, 184–188
half graven: 380, 383
Happy Isles
air blast from: 176
dehis dust cloud: 388
studies of: 184–188
trigger mechanism: 167
Hawaii
Kilauea volcano: 229
Koolau volcano: 228–229
Mauna Loa volcano: 210
Heim, Albert: 237–240
High Peak
fracturing of: 67
historical events: 64
physical setting: 41–43
Hintersee: 250
Hochstetter Glacier
path, material: 47, 52
physical setting: 39
Holocene deglaciation: 138, 146
homocline: 307
Honda (town): 8
Hooker Glacier: 64

f—figure; m—map; p—photograph; t—table
Hope: 48, 212p
hornfels: 72
horst: 215, 383
Huailín earthquake: 310, 320, 322
Huara: 12, 15
Humahuaca: 23–25
hummock
facies in: 218
in Miocene subaerial deposits: 385
in Mount Shasta debris field: 226
orientation of: 223
in Raung deposit: 228
in Slade Mountain debris field: 155
in volcanic deposits: 214–215
Hunza River: 347
hydrothermal alteration
in lahars formation: 218
trigger mechanism
at Cerro Rabicano: 21, 138
Unzen volcano: 223
volcanic events: 210–211
hydrothermal vents
clay mineral generation: 211
gypsum precipitation near: 383
volcanic: 210

I
igneous rocks: 11, 138
illite: 391
impact hollow
in Alpine events: 244
chak: 280, 296
Imperial Formation: 383f
Indian plate: 345
Indonesia: 211–212, 227–228
Indus River: 347
Inman sorting coefficients: 213
interference patterns: 397
iron mines: 253
Isabel, Mount: 64
Isle of Thanet: 257, 274, 294
isopach analysis: 397
Italy: 71–88, 237–254
Iyang-Arappinga volcano complex: 227–228

J
Japan: 210–211, 220–224, 231
Jasmund: 284–289
Java: 211–212, 227–228
jigsaw cracks
in deposits: 218, 363, 367
in Karakoram deposits: 351
in megabreccia: 388, 394, 398
in plutonic-rock breccia: 384
in volcanic deposits: 216
Jocotitlan volcano: 215
Joint Roughness Coefficient (JRC): 77
joints
breccia: 225
in carbonate sediments: 243
in Cerro Rabicano: 138
in Continental Range bedrock: 193
in crystalline rocks: 243
dilation of: 167, 184
in gravel sediment: 252
in Lishi Loess: 153
in Malan Loess: 153
of Mount Cook bedrock: 39, 43, 67
of Mount Fletcher bedrock: 39, 54, 67
in Randa strata: 248
in Slade Mountain Neogene strata: 153–154
in Slade Mountain: 168
in slope-stability modeling: 64
Joss Bay: 257, 274, 294
JRC: 77
Julian Schist: 397
Jurassic
batholith: 387
Continental Range: 193
foreland basin clastic rocks: 340
igneous rocks: 138
marine sedimentary rocks: 138
metamorphic rocks, foliated: 3
terrigenous sedimentary rocks: 138
K
Kamchatka: 210–211, 220, 230
Kane Phutonic Unit of Searle: 367
Kandersteg: 243
kaolinite: 159, 391
Karakoram Himalaya
brandung wave: 359–366
epigenetic gorges of: 359
geology of: 345–346
geology on: 345
impound dams: 350
landslides in: 346–348
morphometry of: 348–351
settlement sitting: 374
studies in: 345–375
topographic constraints on: 355–373
uplift dating: 346
volume of material moved in: 351
Katzarah: 364
Kaweah River: 170–172
Kennedy Drift: 329
Kent
chalk porosity: 289
height of cliffs: 294
studies in: 257, 260, 265
kettle holes: 138, 214, 338
Kilauea volcano: 220
kinematics, modeling of. See also coefficient of
kinetic friction
for folds: 397
for Mount Cook: 64–66
for volcanic events: 211
Kings Canyon National Park: 170–172
Kingsdown: 274, 294
Kobandai volcano: 220–221
Köfels
dating of deposit: 248
flow separations: 367
interpretation of deposits: 252
shear zones at depth: 367
studies in: 250
Taufenberg hill deposit: 357
volume of material moved in: 243
Kohistan-Ladakh terrane: 346
Komagatake volcano: 210, 231
Koolau volcano: 228–229
Kragatu volcano: 223
Kushigamine volcano: 220–221

L
La Josefinas: 11–12
lacustrine sediment
in Continental Range: 193
deposit: 321
facies: 19, 220, 231
integration into deposit: 252
liquefaction of: 193
Lago Atuel: 304
Lago Cari Lagoon: 23, 303–304
Lago Vavace-Campos: 304
Lago Yanahui: 15
Lagunas de Yala: 304–305
lahar. See also flood
characteristics: 217f
deposit: 209–210
facies: 218, 228
formation of: 4–8, 220, 231
inverse grading in: 218
material proportion in: 218
at Mount St. Helen: 220
at Nevado del Ruiz: 5–8
speed of: 5
Lake Tekapo: 39, 59–61
Lambert shale: 121
limnlar flow: 212, 244
Langdon Bay: 272, 294
Las Derrumbadas volcano: 210
lateral spreading: 168
lateritic soil: 8
Laurel Creek: 119, 129
Laurentide ice sheet: 337
levee
formation of: 82, 225, 244–245
shear strength: 215
Lewis thrust: 326, 337, 341
Liberty Cap: 173–176
limestone
in Austria: 341
in Cerro Rabicano: 20
in Colimapu Formation: 139m
coonoididal: 326
Devonian Fairholme Group: 339–340
dissolution of: 146
in Lo Valdés Formation: 139m
Middle Cambrian Elko Formation: 339–340
Mississippian: 337–338
in Porcupine Hills Formation: 326
shear strength loss: 146
source material
Cerro Rabicano: 138, 146
Chungar: 15
Ulster White Limestone: 257, 259
Lingxia Group: 152–153
Livingston Range: 326, 339–340

Index
Index

Lo Valdés Formation: 20–21, 139m
loading
gravitational: 225
induced ductile creep: 340–341
static: 292
of toes: 81, 201
undrained
in Adda river bed: 85
in coal mine waste piles: 194, 201
mobility impact: 252
self vs. superimposed: 290
loess
rupture surface through: 156, 161–162
superjacent to Pliocene mudstone: 152, 155
Loess Plateau: 149–162
Loma Prieta earthquake: 117, 119–122, 133
London earthquake: 272
Longyang Gorge: 157
Los Gatos Creek: 118–119
Lower Price Lake: 179

M
Madison Canyon: 364
Maglevandsfald: 283
magnetic stratigraphy: 329, 380
Main Divide fault: 39, 43, 61, 67
Maïtenes hydroelectric plant: 20–21, 135–136, 141–147
Malan Loess: 151–153
Mammoth Lakes earthquake: 166–167
marble: 4, 394, 397
Mars: 214, 355
matrix facies: 216–218
Maud Glacier: 39, 54, 57–59, 64, 68
Mauna Loa volcano: 210
Mayummarca: 17–19, 296
Mayu-yamana lava dome: 222–223
McConnell thrust: 326
MCS scale: 75
Meager, Mount: 64
Medellin: 8
megabreccia. See also breccia
ages of: 382
coloration of: 385, 387, 392
crush-rock streamers: 392
domains of: 387–388
dust cloud from fragmentation: 388
emplacement flows: 380–382
fabric: 388
flow indicators: 391–392
geochemical analysis of: 388–391
Miocene subaerial deposits: 384–392
paleogeographic reconstruction of: 383
Pliocene submarine deposits: 392–397
stratigraphic deposition of: 382m, 383f
study of: 384
subaerial vs. submarine deposits: 397–398
texture of: 388
Mercalli, Cancani, and Sieberg (MCS) scale: 75
Merced River: 181
Mesozoic
basaltolith: 165
granodiorite: 176
igneous rocks: 383f
metamorphic rocks, foliated: 383f
sedimentary rocks: 326
thrust sheets: 340
Metamorphic Complex of Sarcle: 345
metamorphic rocks, foliated
Jurassic: 3
stratigraphic deposition of: 382m
Triassic: 3
meteorite–impact features: 348
Mexico
Las Derrumbadas volcano: 210
Nevado de Colima: 213
Orizaba volcano: 218
Popocatépetl volcano: 231
mica schist
in megabreccia: 394, 397
in Mount Zandila: 72, 245
in Waters deposit: 397
microcline: 394
Middle Brother: 179–184
Middle Cambrian Elko Formation: 339–340
migmatite: 25
mining
in Alps: 253
Brenda Mine: 48
coal mines: 191–208, 338
gypsum: 136
La Josefina: 11
limestone: 136
waste piles
failure of: 200
geology of: 191–194
modeling of: 199–205
monitoring of: 197–198
properties of: 194
structure of: 194–197
studies of: 191–208
volume of material moved in: 200
Miocene
age of facies: 380
andesitic volcanic rock: 383
Calchaquíes: 307, 308f, 311
conformity of deposits: 382, 382m
crustal extension during: 380
depositional features from: 382m
default-generated topography: 380, 383
Flaxville-Blackfoot surface: 329, 341
foraminifera, dating of: 380
megabreccia emplacement flows: 380–382
paleogeographic reconstruction of: 383
Shih-Liu-Feng shale: 91, 92
subaerial deposits: 384–392, 398
Ta-Wuo sandstone: 91, 92, 105–109
tectonic activity in: 384
Mirror Lake: 169–170
Mississippian limestone: 337–338
mixed facies: 216–218, 225–228
mobility
of chalk flows: 259, 289–291, 294
classification of: 259
of coal mine waste: 203
factors: 354–355
fahrböschung. see fahrböschung
geomorphic control impact on
Estero Parraguirre: 140

Val Pola: 86
hypotheses for: 161, 207–208, 398
index of landslide. see fahrböschung
laminar flow: 212
loading, undrained: 252
modeling of: 213, 230
for coal waste pile flows: 203–205
distance traveled: 66
by Heim: 240
for Mount Cook: 64–66
for Sale Mountain: 160–161
using sliding friction values: 335
morpheometry impact on: 320
pore-water pressure impact on: 252, 289–293
of Sale Mountain: 160–161
topography impact on: 244, 354–373
turbulent flow: 67–68, 212
undrained loading: 290
volcanic: 211–214
modeling
using Bingham-model rigid plug flow: 212
centroids of prefailure: 225
do chalk flow mobility: 296
do coal mine waste flows: 199, 201
do creep, gravitational: 157
using double wedge model: 199
using dynamic runout analysis: 203
do earthquake: 97–98
using energy line model: 240
do facies: 384
using finite element model: 157, 201
do fluid pressures: 210
of fracture depth: 157
using frictional model: 203–205
grain-dispersive models: 213–214
do grain-size grading: 52–54
using Janbu method: 64
of jigsaw cracks in deposits: 216
do kinematics: 64–66
of material transportation: 217
of mobility: 213–214, 230
for coal waste pile flows: 203–205
distance traveled: 66
fahrböschung. see fahrböschung
do Heim: 240
for Mount Cook: 64–66
for Sale Mountain: 160–161
of motion of spheres: 217
of Mount St. Helens deposit: 220
do precipitation: 98
of rock-mass deformation: 77, 156
using Rosin’s law: 52–54
of Sale Mountain: 160–161
using Sharma’s simplified Janbu method: 64
of slope stability: 64
do trigger mechanism: 77–78
of Tsao-Ling: 97–98
of tsunami: 231
of Val Pola: 86
using Voellmy model: 205
of volcanic activity: 211–214
using Weibull distribution: 52–54
Modified Mercalli scale: 75
Mohr-Coulomb parameters: 201
Mokowan Butte: 326, 329, 335–337, 342

f—figure; m—map; p—photograph; t—table

Downloaded from https://pubs.geoscienceworld.org/books/chapter-pdf/3744332/9780813758152_backmatter.pdf by guest
gravitational spreading: 123–125
Rinhue: 19–20
Río Aguas: 11
Río Águas Callentes: 308
Río Azurudro: 5–8
Río Barrancas: 13–14–15
Río Bollón: 308, 314, 318, 321
Río Chinchina: 8
Río Coca: 11
Río Colorado. See also Estero Parraguirre
climate of: 136
damming of: 140–143
discharge rate: 136, 140
geology of: 138
morphology of: 136–138, 144–145
studies of: 20–23, 135–148, 303–304
topography of: 136
velocity of material: 140–143
Río Corral Quemado: 308
Río Damasa Formation: 20–21
Río de Janeiro: 25–28
Río Due: 11
Río Due Grande: 11
Río Escoipe: 23–25
Río Grande (Argentina): 23–25
Río Guai: 5
Río Jadon: 11
Río Lagunillas: 5–8
Río Limon: 4
Río Magdalena: 8
Río Maipo: 135, 144
Río Malo: 11
Río Mantaro: 12–15, 17–19
Río Moras: 8
Río Olivares: 143
Río Paez: 8
Río Palibana: 28
Río Patalaino: 28
Río Paute: 11–12
Río Quijos: 11
Río Quiteñahua: 28
Río Salado: 11
Río San Pedro: 19–20
Río Santa: 12, 15
Río San Vicente: 8
Río Villavil
aquifer-recharge areas: 137
hazard evaluation: 319
location of: 311
path taken by: 308
river: 311, 312
rock avalanche: 335
rock glide: 334
Rock Quality Designation (RQD): 77
rockslide: 334–335
Rocky Mountains
Colorado: 308
landslide morphometry: 337–338
morphology of: 192, 293–329
recession rate: 341
seismic activity in: 329
stratigraphy of: 327h
structural RORS: 340–341
Rose Canyon fault: 380m

Rosin's law: 52–54
rotational slump: 334
Round Down: 295–296
Rügen: 258–259, 287–289
Rundle Group: 338–341

S
Sale Mountain
climate of: 151–152
geology of: 150–153
geomorphic control in: 155–156
kinematics: 159–160
mechanical properties testing: 153–154
mobility: 160–161
modeling of: 156–157, 160–161
morphology of: 154–156
morphometry of: 149–151, 153–159
noise: 157
precipitation: 151–152
seismic activity: 154, 160
studies of: 149–162
temperature, internal flow: 157–159
topography of: 149–151
trigger mechanism: 149
velocity of material: 149, 160
volume of material moved: 149
salt mines: 253
Salton Trough: 380
San Andreas fault: 121–123, 133, 380m
San Bartolomeo: 77, 82–85
San Fernando de Escoipe: 23
San Francisco earthquake (1906): 121, 133
San Jacinto fault: 380m
San Lorenzo Formation: 121, 125
San Martinic Serravalle: 82
sandstone
in alluvial-fan deposits: 385
in Araucanenese: 312
arkosic: 17
Butano: 121, 125
Calchaquense: 307–308, 308f
in Carboniferous-Cretaceous graywacke: 39
in coal mine waste piles: 194, 203
in Colipuma Formation: 139m
Continental Range: 193
failure of Mesozoic: 341
in Foothills: 335
in Lingua Group: 152–153
Miocene Ta-Wuo: 91, 92, 105–109
in Porcupine Hills Formation: 326
Proterozoic: 340
source material
Mayuama ca: 17
Mount Fletcher: 54
subjacent to megabreccia: 392
superjacent to megabreccia: 385, 388
Vaqueros: 121, 125
in Villa Del Monte bedrock: 125, 129
in Willow Creek Formation: 326
Sant’ Antonio Morignone: 82
Santuario: 8
sapping: 340, 341
Sargent fault: 123
Sassavin-Motta ridge: 77, 82, 83

Index

in Caracas: 3–4
at Cerro Rabinaco: 146
in Chuñí: 10
at Kaesei River: 170
for La Josefina: 11
on Mount Tsao-Ling: 98
in Petropolis: 28
in Reventador region: 10–11
in Río de Janeiro: 25–28
in Río Escoipe watershed: 23
in Río Limon watershed: 4
in Río Paez watershed: 8
in Serra das Araras: 25
at Slide Mountain: 179
Val Pola: 75, 78–79, 245, 248, 254
volcanic events: 210–211
prehnite-pumpellyte facies: 39
Pressure: 82
Proterozoic Belt: 326, 340
psammites, tuffaceous: 308
pshphites, tuffaceous: 308
pumppellyte-actinolite facies: 39
Purcell rocks: 326, 337
Purisima Formation: 121
Purmamarca: 23–25
putty chalk: 291–292, 294
pyroclastic flows
deposit characteristics: 218, 231, 312–314
prismatic fractures in deposits: 216
subjacent to lava flows: 221, 225
temperature, internal flow: 213

Q
QFIL: 394
quartz
heads, formation of: 159
crystals: 387
diffractograms: 391
phenocrysts: 387
Quartz Diorete of Mount Gibson: 169
quartz, feldspar, lithic (QFL) composition: 394
quartz monzonite: 168
quartzite: 8, 340, 397
quartz-mica schists: 4
Quebrada Cocachacay: 17–19

R
Rainier, Mount: 218
ramps: 392
Rams gate: 294
Randa: 248, 251, 254
Ranahica: 15
Raung volcano: 212, 227–228
resistant over recessive (ROR) successions: 337, 339–341
Reventador volcano: 10–11
Reynolds numbers: 212
Rices Mudstone: 125
ridge
formation of
horizontal: 248
longitudinal: 85, 214, 244
sinuous: 226
transverse: 85, 155, 222–224, 334
saturation
loss of shear strength: 146, 154
of volcanic rock: 210
waste piles, coal mines: 194, 195, 197
schistose parageneses: 248
schists: 4, 8
Schrofen mountain: 240
Sefton, Mount: 61
seismic activity from
fault rupture: 47–48
shallow (surface) event
at Brenda Mine: 48
at Cerro Rabicano: 21, 135, 138, 145
at Happy Isles: 184
at Hope: 48
modeling of: 65–66
at Mount Cook: 35, 47–50, 66
at Mount Fletcher: 57
at Sale Mountain: 154, 160
signature of: 48–49
at Val Pola: 82
self-organized criticality: 67
Sentinel Granodiorite: 173, 183
sericite phyllites: 4
serpentinite mining: 253
Sierra das Araras: 25
sewage leakage into soil: 4
Shakespeare Cliff: 270–271, 295
shale
Cambrian Gordon Formation: 340
carbonaceous: 194
in Cerro Rabicano: 20
in coal mine waste piles: 194
failure of Mesozoic: 341
Lambert: 121
in Lo Valdés Formation: 139m
Miocene Shih-Liu-Feng: 91, 92
in Porcupine Hills Formation: 326
in St. Mary River Formation: 326
Twohar: 125
in Villa Del Monte bedrock: 125, 129
in Willow Creek Formation: 326
sharpstones: 348
Shasta, Mount: 226–227
shear resistance: 157
shear strain: 39
shear strength. See also Bishop’s brittleness index
along foliation: 4
drained: 197
foliation: 4
frost penetration impact: 197
levée formation: 215
loss of, from saturation: 146, 154, 194
at Mount St. Helens: 220
undrained
in Adda river bed: 85
in coal mine waste piles: 194
shear stress
in coal mine waste piles: 201
concentration zone: 156–157
in debris flow: 388
fold formation: 397
in modeling: 65, 157
plastic zone: 157
release of: 67
shear zones
at depth: 367
of transgressive fault: 312
Sherman Glacier
coefficient of kinetic friction: 49
transportation of deposits: 248
Shih-Liu-Feng shale: 91, 92
Shikarjerah rock: 367
Shimahara Peninsula: 222–223
Shiveluch volcano: 210, 211
Shyok Melange of Brookfield: 367
Sierra Nevada
climate of: 165–166
earthquake (1872): 166
geology of: 165
Mammoth Lakes earthquake: 166–167
Owens Valley earthquake: 166, 172–174
precipitation in: 165, 176–179
seismic activity in: 166
studies of: 165–189
topography of: 165
Sierras Pampeanas
geology of: 307–308
morphology of: 307
seismic activity in: 310–311
stratigraphic divisions: 307–308
Sierran
interpretation of deposits: 250–251
volume of material moved in: 243
Sigerslev quarry: 282
sillstone
in Carboniferous-Cretaceous graywacke: 39
Continental Range: 193
in Lingua Group: 152–153
in Mount Fletcher: 54
Pliocene: 152, 155
in Villa Del Monte bedrock: 125, 129
sinistral vergence: 397
slab movement
in block–glide event: 311
Cerro Rabicano: 138
deformation of: 181–182
folded: 315–317
fracturing during: 312
Middle Brother: 181–182
modeling of: 64
Mount Thomson: 61, 64
overriding: 317–318
Villavil: 317
slate mining: 253
slate, Proterozoic: 340
Slide Mountain: 168, 179
sliding-block model: 64–66
slip
in compound events: 160
fault rupture: 121–123
folds from: 397
interference patterns from: 397
from precipitation: 4, 10–11
reduction in: 312
rock-mass deformation: 67, 77
shallow: 4
in Summit Ridge area: 121–125
surfaces, from previous event: 312
thin: 4

f—figure; m—map; p—photograph; t—table

slip line: 397
slump: 4, 334
smectite: 391
Socomba volcano: 211, 214, 225–226
Soufrière Guadeloupe volcano: 231
South America: 1–3, 28, 30–32. See also specific
countries, volcanoes
South American plate: 1
South Foreland: 272–274, 294
South Fork: 176–179
Southern Alps (New Zealand)
geology of: 39
hazard evaluation: 68
morphology of: 39
Southern Oscillation: 23
sphere: 387
Split Mountain
geology of: 380, 382m
map of: 381m
Miocene subaerial deposits: 384–392, 398
paleogeographic reconstruction: 383–384
Pliocene submarine deposits: 392–397
subaerial vs. submarine deposits: 397–398
volume of material moved in: 385
Split Mountain Formation
Miocene subaerial deposits: 384–392
stratigraphic deposition of: 383f
St. Aubin: 294–295, 298
St. Helens, Mount
fragmentation in: 220
grain-size analysis: 218
Inman sorting coefficients: 213
lateral blast from: 219–220, 230
magmaic intrusion: 211
material proportion in: 215–216, 220
mobility of material: 211–212
modeling of: 230
morphometry of material: 219–220
vs. Mount Shasta: 227
Reynolds numbers: 212
vs. Socomba: 225
studies of: 211–220
temperature, internal flow: 213
velocity of material: 211–212, 219
St. Margaret’s Bay: 273–274, 294, 298
St. Mary River Formation: 326
St. Valery-en-Caux: 279
steinmehl: 348
step-up geometry: 391–392
Stevns Klint: 282–283
streamers, crushed-rock: 392
stress
deviatoric: 194
modeling of: 156
state determination: 155
stress release
in Mount Cook: 43, 67
in Mount Fletcher: 54
in Randa strata: 248
in Sale Mountain: 154, 156
in Sierra Nevada range: 167, 184
in Southern Alps (New Zealand): 39
as trigger mechanism: 251
stress-displacement: 153–154
striations, flow indication: 391
Index

volcanic events: 213, 229
Tenaya Creek: 169
tephra: 217, 220
Tertiary
igneous rocks: 138
marine sedimentary rocks: 121, 138
metamorphic rocks: 8
sedimentary rocks: 92, 305
strata in: 308f
submarine deposits: 228–229
terrigenous sedimentary rocks: 138
volcaniclastic gravels: 225, 305
thalweg: 79
thermoclastic disintegration: 136, 146
Three Rivers: 170
tidal-flat deposits: 386
Tiltill Creek: 168–169
Tigora glaciation: 168–169, 174
Tirindere: 82
Toe, Mount: 237
Toez: 13p
Tonale, Mount: 72
tonsile
debris dust cloud: 388
in megacreaca: 386, 387, 394
toreva blocks: 214, 217, 222, 225
Toutle River: 219–220
translational event: 8
transport direction: 397
trees, destruction of
in Alps: 253–254
at Happy Isles: 184
in Kawaih River watershed: 172
in Rinhue area: 19
in Rio Pater watershed: 8
by Val Pola: 82
Triassic
footwall rocks: 329
metamorphic rocks, foliated: 3
trigger mechanisms: 398
earthquake: see earthquake
glacial recession: 251. see also glacier
hydrothermal alteration. see hydrothermal alteration
mining: 11, 191–208, 253, 338
plate tectonics: 1, 39, 398
pore-water pressure. see pore-water pressure
precipitation. see precipitation
sewage leakage into soil: 4
for state transition: 319
stress relaxation: 251
temperature. see temperature
in urban areas: 4
volcanic activity. see volcanic activity
water seepage. see water seepage
weathering: 251. see also weathering
Tsao-Ling, Mount
borehole sampling of: 109
Chia-Yi earthquake: 92
damming of Ching-Shui River: 92–97, 114
geology of: 91–92, 109
groundwater: 109
modeling of Chia-Yi earthquake: 97–98
morphology of: 92, 98–109

morphometry of: 96–97
precipitation: 96, 98
studies of: 91–114, 114
cause of: 97–98
precipitation: 98
volume of material moved in: 92, 96
Tsingtau: 248, 250, 252
Tsuchi-shima: 223
tsunami
Augustine: 224
formation of: 231
Krakatau: 223
Unzen: 223
tuff: 308, 308f
Tupungato volcano: 145
turbidites: 252, 382m, 383f
turbulent flow: 67–68
Tuttle Mountain: 326, 338–339
Twain, Mark: 167
Twobar Shale: 125
types of: 398
by Abele: 241
by Hiein: 240
by Hutchinson: 259f
for mapping: 334–335
volcanic: 209

U
Ulster White Limestone: 257
United States of America: 295. See also specific states
Unzen volcano: 222–223, 224
Upper Price Lake: 179

V
Vajont reservoir: 237
Val Btenico: 240
Val Pola. See also Valtellina; Zandila, Mount
air blast: 82
deformation: 79–81
dust cloud: 82
erosion prior to: 81
fahrböschung: 86
flood: 82, 85
kinematics of: 81–82
modeling of: 77–78, 86
morphology of: 75–77, 82–86, 245
morphometry of: 86
precipitation prior to: 75, 78–79, 248, 254
seismic activity from: 82
studies of: 71–88
trigger mechanism: 77–81
velocity of material: 86, 247
volume of material moved in: 86, 245
water displacement wave: 82, 85
Val Pola fault: 75
Valleestio Mountains
map of: 381m
Miocene subalpine deposits: 384–392, 398
paleogeographic reconstruction: 383–384, 386
Pliocene submarine deposits: 392–397
Valtellina. See also Val Pola
damming of: 71, 245
deformation rate: 77, 81
Index

geology of: 72–75, 77
Hutchinson's classification of: 77
morphology of: 75–77
seismic activity in: 75
water seepage in: 78–81
Vaqueros sandstone: 121, 125
Vavarco-Campos: 304
Venezuela: 3–4
vergence: 397
Veredo: 85
Villa Del Monte. See also Summit Ridge
geology of: 125
morphometry of: 125–129
path taken by: 132
studies of: 125–133
topography of: 125
volume of material moved in: 132
Villa Tina: 8
Villalvín
dating of deposits: 320–321
deposits: 312, 318
en echelon faults: 307, 308–310
géologie of: 307–308
hazard evaluation: 318–322
La Angostura: 314
mobility of: 320
morphology of: 307, 308
morphometry of: 311–320
seismic activity in: 310–311, 319–320
slab movement: 317
stratigraphic divisions: 307–308
study of: 303–323
volume of material moved in: 311, 314, 318
Visalia: 170
Vispa River: 248
volcanic activity
caldera formation: 211
deposit characteristics: 215st, 216–218
events at site of: 209
frequency of occurrence: 210
grain-size analysis: 218
hazard evaluation: 230–231
human sorting coefficients: 213
instability factors: 210–211
lahar, see lahar
mobility: 211–214
modeling of: 211–214
morphology of: 211, 214–218
prediction of: 8
studies of: 209–210, 231
submarine deposits: 228–229
trigger mechanism: 1, 4–5
velocity of material: 211–212
volume of material moved in: 214
Volcanic Complex
definition of: 308
hazard evaluation: 321–322
morphology of: 312
slip surfaces within: 312–314, 318

W
Washington: 218. See also St. Helens, Mount
water seepage
in coal waste piles: 195
trigger mechanism
at Cerro Rabinaco: 21, 146
at Randa: 248
Tsao-Ling: 109
Val Pola: 78
Villa Tina: 8
Waters deposit: 397
wave, water displacement. See also flood
at Chungar: 15
at Maud Glacier: 59–61
modeling of: 231
in Randa: 248
at Slide Mountain: 179
tsunami, see tsunami
in Valtellina: 247
weathering
classes of: 77

grade of, definition: 77
putty chalk formation: 292
trigger mechanism: 251
in tropical climates: 4
wedge failure: 64
Weibull distribution: 52–54
Willow Creek Formation: 326
Windsor Ridge: 339–340
Wisconsinan ice age: 329–332
Witow: 289
Würm deglaciation: 77, 86

Y
Yellow River: 150
Yeso Reservoir: 146f
Yosemite National Park
debris dust cloud: 388
Happy Isles: 167, 176, 184–188, 388
Liberty Cap: 173–176
Middle Brother: 179–184
Mirror Lake: 169–170
Old Yosemite Village: 172–173
Slide Mountain: 168
Tillit Creek: 168–169
Yugeta-yama Peak: 221
Yungay: 15

Z
Zana: 157
Zandilla, Mount. See also Val Pola
géologie of: 72–75
morphology of: 75–77, 245
Val Pola source: 72, 245
Zayante fault: 121
Zhizhio: 12
Zurbriggen Ridge: 67

f—figure; m—map; p—photograph; t—table