Index

andesites, Flechtingen–Rosslau Block, Magdeburg 51–66
Apenines, Gavorrano intrusion laccolith 151–61
aureoles, Gavorrano intrusion 155–6
Australian NW Shelf, Exmouth Plateau 226

Black Mesa bysmalith, Henry Mountains, Utah 163–73
construction rate 163–73
geological setting and previous work 164–5
thermal numerical simulations 166–70
Bohemian Massif, Intra-Sudetic Basin, Poland 5–11
Brescian Prealps see Montecampione Group, S Alps
bysmalith construction rate, Black Mesa, Utah 163–73
caldera-related ring complexes 126–42
vs laccolith complexes 126
schematic cross-sections 145
Carboniferous–Permian transition 5–11, 14–15
cauldron subsidence, Rallier-du-Baty nested ring complex 144–6
Central Europe, Permo-Carboniferous examples 13–31
geotectonic setting at Carboniferous–Permian transition 14–15
laccolith complexes
magmatism in strike slip-settings 13–14
strike-slip control 23–9
types 19
Variscan intramontane strike-slip basins 15–19
see also Ilfeld; Saale; Saar–Nahe Basins
Christmas-tree laccolith complex 195–213
Colorado Plateau, laccolith complexes 26, 27, 163–73
deformation experiments, dyke emplacement in partially molten olivines 243–9
discrete element modelling (DEM), sill emplacement 217–27
Donnersberg type laccolith complexes 15, 17–25, 96–9
dyke emplacement
mechanics in partially molten olivines 243–9
experimental details 243–5
results 245–6
mid-ocean ridge basalt (MORB) 243–9
Elba Island, Christmas-tree laccolith complex 195–213

construction of intrusive complex 205–10
geological outline 196–200
intrusive sequences 200–5
Monte Capanne pluton 197–8, 204–10
petrographic and chronological features summarized 201
Exmouth Plateau, Australian NW Shelf, saucer-shaped sill 226

Flechtingen–Rosslau Block, Magdeburg 51–66
emplacement scenario of andesitic magmas 63–5
Flechtingen Sill Complex (FSC) 54–9
Late Palaeozoic volcano-sedimentary succession 52–4
lower andesites 59–61
structure, lithology and emplacement processes 54–9
upper andesites 61–3
fluid–rock interactions, offshore Norway, hydrothermal vents 233–41
fumaroles, Kerguelen Archipelago 142
gas apparatus, Paterson-type 243–4
Gavorrano intrusion, Tuscany 151–61, 196
Germany see Flechtingen–Rossau Block; Ilfeld; Saale; Saar–Nahe Basins
granodioritic intrusions, Kaczawa Mountains, Poland 67–74
groundwater
and diagenesis 112–13
and emplacement of volcanic bodies 113–14

Halle Volcanic Complex 19–23
Hartz Mountains, Ilfeld Basin 15–17
hawaiites 139
heat flow, groundwater and diagenesis 112–13
Henry Mountains
laccoliths, theoretical emplacement depth 179–80
see also Black Mesa bysmalith
Hungary, Ság-hegy peperitic lava lake-fed sills
hydrothermal vent complexes associated with sill intrusions 233–41
Karoo Basin 234–5
modelling fluid pressure evolution 235–8
Ilfeld Basin, Hartz Mountains 15–17
Indian Ocean S see Kerguelen Archipelago
Intra-Sudetic Basin, Poland 5–11
online geology and volcanic evolution 5–6
subvolcanic intrusions 6–8
intrusion shape, power-law distribution 158
intrusive–extrusive domes, Saar–Nahe Basin
INDEX

Himmelberg dome 95–6
Kreuznach dome 100–1
Kuhkopf laccolith and dome 99–100
Lemberg dome 101–2
Nohfelden dome 102
Wilzenberg dome 95

Italy see Elba; Montecampione group, Southern Alps; Tuscany

Joliot–Curie caldera, Rallier-du-Baty nested ring complex 134

Kaczawa Mountains, Sudetes, Poland, Zelezniak Hill 67–74
geochemical features and age 69–71
geological setting/map 67–9
geometry of intrusive complex 71
petrography 67–9
zircon $^{206}\text{Pb} - ^{238}\text{U}$ dating 71–3

Karoo Basin
hydrothermal vent complexes associated with sill intrusions 234–5
saucer-shaped sill formation 219–25

Kerguelen Archipelago, Rallier-du-Baty nested ring complex 126–42
chronological sequence of igneous rocks 135
field notes
country rocks 128–31
Dome Carva volcano 140–1
external trachytic domes and associated pumice deposits 131
Joliot–Curie caldera 134
northern and southern ring complexes 131–4
Pic Saint-Allouarn volcano 141–2
plutonic arcuate dykes 133
plutonic ring dykes and cone sheets 132–8
satellite cupolas 133
Table de l’Institut caldera volcano 138–40
thermal activity 142
time durations and dimensions 142–6
cauldron subsidence 144–6
stoping process 144

tilting and doming of basaltic wallrocks 143–4

laccolith complexes 13–14, 15–19, 23–9
Christmas-tree geometry 19, 26, 208
defined 215
emplacement depth 178–80
Halle type 25
intrusion geometry 181–8
locations
Colorado Plateau 26, 27, 163–73
Elba Island 195–213
Gavorrano intrusion 151–61
Halle Volcanic Complex 19–23
Kaczawa Mountains, Poland 67–74
Saar–Nahe Basin 15–19, 92–6, 108–11
Utah, Colorado 26, 27
and magmatism 13–14
punch(ed) geometry 19, 26, 183
vs ring complexes 126

laccolith complexes 13–14, 15–19, 23–9
Christmas-tree geometry 19, 26, 208
defined 215
emplacement depth 178–80
Halle type 25
intrusion geometry 181–8
locations
Colorado Plateau 26, 27, 163–73
Elba Island 195–213
Gavorrano intrusion 151–61
Halle Volcanic Complex 19–23
Kaczawa Mountains, Poland 67–74
Saar–Nahe Basin 15–19, 92–6, 108–11
Utah, Colorado 26, 27
and magmatism 13–14
punch(ed) geometry 19, 26, 183
vs ring complexes 126

strike-slip basins 13–14
strike-slip control on evolution 23–9
volume estimates 180–1

Little Hungarian Plain see Ság-hegy

maar–diatreme volcanoes, Saar–Nahe Basin 80–8, 106–7
magma–water interactions 33–50
mid-ocean ridge basalt (MORB), dyke emplacement 243–9
modelling
fluid pressure evolution, hydrothermal vent complexes 235–8
saucer-shaped sill formation 215–27
strike-slip basins 28

Monte Capanne pluton 197–8, 204–11
Montecampione Group, S Alps 175–93
emplacement depth 178–80
geological setting 176–8
geometry and relations with host group 181–9
volume estimates 180–1

Monticello fault, Gavorrano area 153, 154–5
More Basin, offshore Norway 222–5
mugearites 139

Nohfelden intrusive–extrusive dome, laccoliths, cupolas, intrusive–extrusive domes, Saar–Nahe Basin 102

North Rockall Trough sill seismic data 229–32
Norway (offshore)
More Basin 222–5
Voring Basin 222–5, 233–41

Pannonian Lake, Hungary 36
Paterson-type gas apparatus 243–4
$^{206}\text{Pb} - ^{238}\text{U}$ zircon dating, Zelezniak Hill, Armorica 71–3

Peninsula Tuff Cone, California 38–40
peperites
Flechtingen–Rosslau Block 59
Ság-hegy peperitic lava lake-fed sills 33–50
Permo-Triassic, central S Alps 175
phreatomagmatic pyroclastic units, peperitic lava
lake-fed sills 36–8
pluton emplacement
rate and mechanism, Black Mesa bysmalith 163–73
tilting, Elba Island 195–213
see also Kerguelen Archipelago; Tuscany
Poland see Intra-Sudetic Basin; Kaczawa Mountains, Sudetes
Porto Azzurro pluton 200, 209, 211

Rallier-du-Baty nested ring complex 126–42
see also Kerguelen Archipelago
ring complexes, caldera-related 126–42
Rockall, North Rockall Trough sill seismic data 229–32

Saale Basin 24
Saar–Nahe Basin 15–19, 75–124
dykes 88, 107
formation of late Variscan basins 76–7
groundwater and emplacement of volcanic bodies
113–14
growth of subvolcanic and volcanic bodies 114
heat flow, groundwater and diagenesis 112–13
igneous bodies 112
laccoliths, cupolas, intrusive–extrusive domes
92–102
Bauwald laccolith 92–4
Donnersberg intrusive–extrusive dome 15,
17–25, 81–3, 96–102, 108–11
Herrmannsberg cupola 94–5
Himmelberg dome 95–6
Konigsberg laccolith 94
Kreuznach intrusive–extrusive dome 100–1, 105
Kuhkopf laccolith and intrusive–extrusive dome
99–100
Lemberg intrusive–extrusive dome 101–2
Nohfelden intrusive–extrusive dome 102
Obermoschel cupola 94
Palatinate Anticline cupolas 94
Potzberg cupula 95
Selberg cupula 94
Walfheuckelheim cupula 92
Wilzenberg dome 95
late orogenic compression and extension in
Variscan collision belt 76–7
lava flows 102–3, 111
maar–diatreme volcanoes 80–8, 106–7
Nahe Caldera 104–6
Prims and Nahe syncline ignimbrite 104, 112
sills 88–92, 107
tephras deposits 103–4, 111–12
Ság-hegy peperitic lava lake-fed sills 33–50
corrugation zones 38–40
fluidization halo 41–4
geological setting 35–6
lava lake-fed intrusions 41–4
phreatomagmatic pyroclastic units 36–8
saucer-shaped sill formation 215–27
discrete element modelling 216–19
sill emplacement modelling 216
sedimentary basins
hydrothermal vent complexes associated with sills
235–8
modelling 216–19
Servino Formation 176–89
sills
3D seismic perspective 229–32
depth range of intrusion 107
emplacement depth 178–80
emplacement modelling 216
hydrothermal vent complexes associated 233–41
peperritic lava lake-fed sills 36–8
propagation mechanisms 107
saucer-shaped sill formation 215–27
volume estimates 180–1
South Africa, Karoo Basin
hydrothermal vent complexes associated with sills
intrusions 234–5
saucer-shaped sill formation 219–25
Southern Alps see Montecampione Group
stoping process 144
strike-slip basins
control on evolution of laccolith complexes 23–9
laccolith complexes 13–14
simple model 28
Variscan 15–19
Sudetes see Intra-Sudetic Basin; Kaczawa Mountains
thermal numerical simulations, Black Mesa
bysmalith, Utah 166–70
trachytes 139
transtensional basin systems 13–31
Tuscany, Gavorrano intrusion 151–61
fault systems 154–5
geological framework 152–5
shape 156–8
thermal metamorphism and hydrothermal
alteration 155–6
Tyrrenian Basin 152
Tyrrenian Sea 196
Utah see Henry Mountains, Black Mesa bysmalith
Variscan belt 68
Intra-Sudetic Basin, Poland 5–11
Kaczawa Mountains 67–74
Saar–Nahe Basin 76–7, 108–11
Verrucano Lombardo 176–89
Voring Basin, offshore Norway
Gleipne Saddle, sills 222–5
hydrothermal vents 233–41
Walbrzych Trough, Intra-Sudetic Basin, Poland 7–8
Zelezniak Hill see Kaczawa Mountains, Poland
zircon [S]206\[s\]Pb–[S]238[s]U dating, Armorica 71–3