

Index

Page numbers in *italics* refer to Figures. Page numbers in **bold** refer to Tables.

- Above Rocks Inlier, Jamaica *510, 513, 515–516, 517*
aeolian sandstones *see* Oxfordian Bacab sandstones, Gulf of Mexico
- Alleghanian Orogeny 46, 47, 62, 66, 86, 100
- Aloapan Fault 286, 294, 295, 299, 300, 307, 308
- anatectic granites 42, 46–47, 46, 47, 48
- Andes, northern 41, 49–51, 50, **51**, 61, 63
- Angelina–Caldwell Flexure 33, 37
- Angostura Formation 291, 292, 316, 317, 318, 320, 321, 325, 326, 331, 407, 408, **410, 449**, 450, 453, 454–455, 456
- Antioquia Terrane 49, 50, **51**
- Apalachicola/Desoto Canyon Basin 80, **81**, 85, 101, 102
- apatite fission track dating 6, 9–10, 177, 180, 257–267, 257, **259–261, 262–264**, 265, 266, 268, 306, 333
- apatite (U–Th)/He thermochronometry 257–258, 257, **262–264**, 265, 266, 306
- Arntully Serpentinite 517
- Arperos Basin 42, 55, 56, 63, 64–65
- Arperos Suture 45, 61, 65
- Arroyo Blanco Formation **410**, 425, 429, 452, 453, 455, 456, 457, 459, 460, 460, 461, 462, 463, 464, 465, 466, 466, 468, 469
- Arroyo Seco Formation 453, 455, 456, 457, 468
- Artesa-Mundo Nuevo Platform 132, 135, 136
- Askenish Formation 524, 526
- asphalt volcanoes 197, 223
- Aves Ridge 349, 352, 357, 361, 363
- Aymamón Limestone 407, 409
- Azua Basin 441, 443
basinal structure 402, 403, 451, 452
burial history 418, 426–427
depth to basement and sediment thickness 405, 414, 415, 418, 459
geochemistry of hydrocarbons 470–473, 471, 472, **473**, 474, **474**
hydrocarbon exploration
history 441, **444–448**
structure and stratigraphy in relation to 457–470, 458, 460, 461, 462, 464, 465, 466, 467, 468, 469, 470
hydrocarbon prospectivity and potential **413**, 429, 431, 439, **449**, 472–473, 474
paleogeographic evolution 455–457, 456
source rocks **412**, 419–424, 439, **449**, 450, 472–473, 474
stratigraphy 407, 408–409, 451–457, 452, 453, 456
- Azua Fault Zone 458, 459–461, 460, 461
- Babia Fault 41, 46
- Bacab-21 well 30, 33
- Bacab Formation 5
see also Oxfordian Bacab sandstones, Gulf of Mexico
- Back Rio Grande Formation 512, 513–514, 513
- Bahamas 3, 16, 17
Great Bank of the Bahamas 35–37, 38–41, 60, 62, 63
hotspot magmatism 41, 62, 64, 65
rifting in Florida–Bahamas peninsula 35–41, 40
see also West Florida Terrane
- Bajocian salt 3–5, 12, 32–33, 36, 37, 129, 130, 141, 142
- Basin and Range Province 48
- Bassin Zim Formation **411**, 417, 426
- Bath Formation 513, 514–515, **515**
- Beata Fault Zone 443, 451, 454, 457, 459, 463
- Beata Ridge 346, 347, 355, 356, 361, 363, 365, 367, 508, 515, 533, 535, 537
- Belleisle Formation 530, 531
- Bellevue Formation 512, 513, 514
- Benbow Inlier, Jamaica 510, 518–522, 519
- Black River Formation 524, 525, 528
- Blake Spur Magnetic Anomaly 33, **38**
- Blasillo Formation 133
- Blue Mountain Formation 513, 517, 518
- Blue Mountains Inlier, Jamaica
assembly of terranes 535–537, 538
Northeast Blue Mountains Terrane 510, 511, 512–514, 512, 513
CLIP rocks 533, 535
petroleum geology 514
Southeast Blue Mountains Terrane 510, 511, 512, 513, 514–515, **515**
CLIP rocks 515, 533, 535, 537
petroleum geology 515
Western Blue Mountains Terrane 510, 511, 512, 513, 515–518
granodiorites 517–518, **517**
metamorphic rocks 516–517, **516**, 533–534
petroleum geology 518
- Bonafo Fault Zone 481, 484, 485, 486, 487
- Bonnie View Formation 512, 513
- Border Formation 513, 515–516
- Bosque Group 132, 137
- Bové Basin, West Africa 88, 89, 101, 104, 105
- Burgos Basin 8, 10, 12, 13, 278, 279
- Burgos Lineament 30, 35, 41, 61–62, 66
- Cabarita Formation 524, 527
- Caborca Block 61
- Cajamarca metasediments 49, 50, **51**
- Campechano Event 128, 128
- Campeche Basin 30, 33, 119, 302, 303, 309
- Campeche Escarpment 183, 184, 185, 191, 194, 198
- Campeche magnetic anomaly 30, 37, 61
- Caño Azul-1 well 482, 487, 488, **489**, 490, **491**, 492, 493–494, 493, 495, 498
- Cantarell Field 9, 12, 120, 121, 123, 132, 137, 140, 144, 149, 153
- Cantelhá Formation 316, 317, 318, 320
- Caribbean Large Igneous Province (CLIP) 15, 17, 348, 349, 350, 351, 355–357, 379, 386, 391
Jamaica 509, 515, 533, 535, 536, 537, 537
see also tectonic terranes underlying Caribbean Plate
- Caribbean Plate 3, 12, 15, 16–17, 16, 289, 380, 401–402, 402, 438–439, 438, 440, 487, 534–535, 538
northward subduction of 389, 390, 391, 394–395, 395
Pacific origin model 344, 345–350
see also tectonic terranes underlying Caribbean Plate
- Carlton Hill Formation 529, 531
- Catemaco Fold Belt 121, 128, 132, 142–143
- Catoche Knoll 80, **82**, 98, 98, 100, 101
- Cayman Spreading Centre 508, 509
- Cayman Trough 16, 17, 349, 349, 353, 362, 508, 509, 537
- Central Atlantic Magmatic Province (CAMP) 33, 35, 41, 88, 93, 95, 102–103
- Central Cordillera of Colombia 49, 50, **51**
- Central Inlier, Jamaica 510, 524–525, 524, 527, 528–531, 532

- Challenger reflector 6
- Chapopote Knoll 197, 223
- Charco Largo-1 well 408, **410**, 415, 416, 420, 426, 428, 482, 487, 488–489, 488, **489**, 491, 492, 498
- Chiapanecan Orogeny 11, 12, 238, 285, 315, 316, 332, 335
- Chiapaneco Event 124–128, 126, 127, 133, 137, 139, 152–158, 152, 155, 156, 157, 162
- Chiapas Fold and Thrust Belt 6, 11, 13, 139, 152
- dating of Eocene deformation 315–335, 334
- apatite fission track dating 6, 333
- illite ⁴⁰Ar–³⁹Ar dating 319–320, 329–332, **330**, 331, 332
- methods 318–320
- structural analysis 319, 321–329, 323, 324, 325, 326, 328, 329, 333
- tectonostratigraphy 316–318, 317, 318, 320–321, 322, 332–333, 334
- integrated plate tectonics and structural geology 285, 286, 287
- chronological summary of the tectonic events 307, 309
- conclusions and inferences 307–310
- data sources 288–289
- plate tectonic setting 289, 290, 291
- stratigraphy 291–292, 292
- structural restorations 301–307, 303, 305
- provenance of Nanchital conglomerate 167–180, 168
- data and methods 171–173, **173**
- dating results 173–175, **174**, 176
- geological framework 169–171, 171, 172
- implications for Sureste Basin reservoirs 180
- interpretation of results 175–178
- schematic cross-sectional model 178–180, 179
- summary of major tectonic events 307, 309, 334
- tectonic framework 289, 290, 291, 315, 316
- Chiapas Massif 30, 31, 32, 46–47, 46, 47, 48, 51, 61, 63, 65, 184, 278, 286, 287, 289, 290, 291, 291, 304, 305, 306, 307, 309, 316, 320, 321, 327, 333, 334
- Chiapas Salt Basin 61
- Chicontepec Formation 9, **264**, 276
- Chicxulub meteorite impact 6, 11–12, 13, 132, 133, 150, 234, 246
- Chinameca Formation 291, 302, 316, 317, 318, 320
- Chivela Nappe 286, 287, 289, 294, 306, 307
- Chivillas Basin 289, 290, 292, 292, 299, 300–301, 300, 301, 307, 308
- Chivillas Formation 42, 44, 64, 287, 289, 290, 291, 292, 294, 296, 296, 297, 300, 301, 307
- chlorite cementation 244
- Chontal Complex 289, 304, 307, 309
- Chortis Block 3, 11, 16, 16, 30, 32, 45, 61, 123, 126, 133, 169, 179, 278, 280, 289, 290, 291, 304, 305, 305, 307, 307, 309, 348, 349, 353–355, 508, 509, 533, 534, 535, 536, 538
- see also* tectonic terranes underlying Caribbean Plate
- Chucacús Complex 30, 60
- Chuchupa Field 369
- Cibao Basin 441, 442
- basinal structure 402, 403, 404, 404
- burial history 420, 427
- depth to basement and sediment thickness 395–396, 396, 405, 414, 415–419
- exploration activities 442, **444–448**, 450
- petroleum prospectivity and potential **413**, 429–430, 431
- reservoirs 490
- source rocks **412**, 424
- stratigraphy 407
- traps 492
- Cibao Formation 407, 409
- Clamstead Formation 522, 523, 524
- Clarendon Block 510, 511, 518, 519
- Clifton Formation 524, 526
- Cocos Spreading Ridge 152
- Colombia Basin 508, 509, 533, 535, 537
- Comalcalco Trough 11, 13, 126, 127, 132, 134, 135, 136, 137, 140, 141, 158
- Couva Anhydrite 54, 63
- Crofts Synthem 511, 524, 525–527, 528, 536
- Cross Pass Formation 513, 515
- Cuba 508–509, 508, 534, 535, 537
- Cuicateco Belt 30, 42–45, 43, **44**, 46, 57, 58, 64
- integrated plate tectonics and structural geology 285, 286, 287, 288
- Chivillas Basin 289, 290, 292, 292, 299, 300–301, 300, 301, 307, 308
- chronological summary of the tectonic events 307, 308
- conclusions and inferences 307–310
- data sources 288–289
- Late Cretaceous–Eocene shortening 293, 294–296, 295, 296, 297
- major faults 294, 296
- Oaxaca Fault 286, 293, 294, 295, 296, 297–298, 297, 298, 299, 300, 301, 307, 308
- plate tectonic setting 289, 290, 291
- platform carbonates 290, 293, 297, 300, 301, 302
- Sierra de Juárez mylonite complex 286, 288, 294, 296, 297, 298, 298, 299–300, 299, 300, 308
- stratigraphy 289–291, 292
- structural restorations 292–301, 293, 295, 297, 299, 300
- tilting of Sierra de Juárez and Veracruz Basin 296–297
- Cul-de-Sac-1 well 409, **410**, 415, 416, 420, 426
- Cul-de-Sac Basin *see* Enriquillo/Cul-de-Sac Basin
- Dawburns Content Formation 524, 525, 528
- Deep Sea Drilling Project (DSDP) 79, 184–185, 197, 198, 450, **473**, 474
- deep-water Gulf of Mexico 183–199, 184
- crustal distribution 185–187, 188, 189, 190
- petroleum systems 197–198, 198
- regional geological framework 183–184, 184
- seismic-stratigraphic correlation 185, 186, 187
- structural and sedimentary evolution 188, 192–197, 193, 194, 195, 196, 197
- structural provinces 184, 187–192, 188, 190, 191
- see also* Yucatán margin
- Demerara Rise 37, 39, 41, 62
- Dias Formation 524, 526, 527
- Dominican Republic *see* Hispaniola; San Pedro Basin
- Dry Hill Formation 524, 525
- Durham Formation 512, 513
- Eagle Mills Formation 3, 85, 102
- East Mexico Transform 9, 30, 31, 32, 36, 41, 42, 45, 63, 65, 192, 286, 287, 289, 290, 294, 295, 298, 301
- East Texas Basin 65
- Edzna Formation 129, 130–132, 134–135
- Ek-Balam Field 130, 135, 136
- see also* Oxfordian Bacab sandstones, Gulf of Mexico
- Ek-Balam Formation 5, 236, 237
- El Bosque Formation 316, 317, 318, 321, 332, 335
- El Limonal Formation 483, 485, 486
- Enriquillo/Cul-de-Sac Basin 441, 442, 443, 457, 458
- basinal structure 402, 403–404, 451
- burial history 416, 426
- depth to basement and sediment thickness 395–396, 396, 405, 414, 415, 416, 459
- exploration activities 442, 443, **444–448**, **449**, 450
- paleogeographic evolution 455–457, 456

- petroleum prospectivity and potential **413**, 428, 430, **449**
 source rocks **412**, 419–424, **449**, 450, 474
 stratigraphy *407*, 408–409, 451, 452, *453*, 454–455
- Enriquillo–Plantain Garden Fault Zone 379, 380, 383, 386, 387, 388, 391, 392, *402*, 404
- Equatorial Atlantic reconstruction 33–35, **38**, 39
- Farallon Ridge ‘hotspot’ 126
- Florida–Bahamas peninsula
 rifting 35–41, *40*
see also West Florida Terrane
- Florida Peninsular Arch 35, 38, *40*
- Florida Straits 30, 63, 65
- Florida Straits Basin *80*, **82**, 89, 90, *91*, *92*, *101*
- Florida Transfer Zone 30, 35, 37, 38, *40*, 60, *80*, **82**, 85, 87, 89, 100–102, *101*, *104*
- Galapagos Hot Spot 533
- Garbrook Formation 515–516
- Glenbrook Formation *524*, *527*
- Gonave Microplate 379, 380, *395*, *402*, *402*, *508*, 509, 535
- Grange Inlier, Jamaica *510*, *524*, *524*, *526*, *527*, *528*, *530*
- Great Bank of the Bahamas 35–37, 38–41, 60, 62, 63
- Greater Antilles Arc/Great Arc of the Caribbean 3, 12–16, 17, 394, 508
 collision with Chortis and Yucatán Blocks 60, 65, 289, 307, 308, 534–535
 evolution of Jamaica and 536, 537, 538
 sedimentary basins of northeastern Caribbean and 401, 402, *402*, 404, 408, 414
see also tectonic terranes underlying Caribbean Plate
- Green Bay Schist **516**, 517, 536
- Green Island Formation *524*, *527*
- Green Island Inlier, Jamaica *510*, *524*, *524*, *526*, *527*
- Green River Formation *529*, *532*
- Grupera Formation *316*, *317*, *318*
- Guajira Block 49, 60
- Guerrero Arc 48, 56, 57, 58, 59, 63
- Guerrero Terrane 534, 535
- Guianas Basin 60, 62
- Guinea Corn Formation *527*, *529*, *531*, *532*
- Gulf Basin Depositional Synthesis (GBDS) project 235
- Gulf of Mexico 2
 evolution and tectonic history 3–12, *4*, *6*, *7*, *8*, 204–205, *204*
 summary of key hydrocarbon systems 12, *13*, *14*
 tectonic framework 1–3
see also deep-water Gulf of Mexico; synthesis of Gulf of Mexico rift and drift history
- Haiti *see* Hispaniola; San Pedro Basin
- Haiti sub-basin 415, 419
- Hancock Arch *80*, **81**, 98, 99, 100
- Hanover Block *510*, 511, 526
- Harvey River Formation *524*, *526*
- Haughton Court Formation *524*, *526*
- HeFTy modelling 265, 267–270, *269*, *271*, *272*–*273*, *274*–*275*, *276*, *277*
- Hertford-1 well *510*, *520*, *521*, *524*, *527*, *530*, *531*, *536*, *537*, *539*
- Hess Escarpment *364*, 365, 367, *508*, 509, 533
- Higuero Field
 exploration activities 442–443, **444**–**448**, 450, 480
 geochemistry 470–473, *471*, *472*, **473**, *474*, **474**
 reservoirs 472–473, *474*
 source rocks 472–473, *474*
 structure and stratigraphy 457, 459, *460*, 461–463, *461*, *462*, *465*, *466*, *468*
 traps 474, *487*
- Hispaniola 401–432, 437–474
 basinal structure *402*, 403–408, *404*, *405*, 451, *452*
 burial history
 data and methods 409–412, **410**, **411**, **412**, 413–414, **413**
 results *416*, *417*, *418*, *420*, 426–428
 depth to basement *403*, *405*, **406**, 409, 412, 414–419, *416*, *417*, *418*, *459*
 geochemical analysis of source rocks
 data 409, **410**, **411**, **412**, **413**, 470, *471*
 methods and results 412–413, *414*, *415*, 419, 424–426, 470–473, *472*, **473**, *474*, **474**
 hydrocarbon exploration
 history *441*, 442–450, **444**–**448**, **449**
 structure and stratigraphy in relation to 457–470, *458*, *460*, *461*, *462*, *464*, *465*, *466*, *467*, *468*, *469*, *470*
 hydrocarbon prospectivity and potential 395–396, *396*, **413**, *415*, 428–431, 439, **449**, *472*–*473*, *474*
 integration of tectonic geomorphology and crustal structure 379–397, 380
 data and methods 380–382, 382
 geomorphology results 382–386, 383, 384, 385, 386
 gravity modelling results 386–391, 387, 388, 389, *390*
 implications for petroleum prospectivity 395–396, *396*
 inferring areas of active uplift 391–392, *392*, *393*
 northward subduction of Caribbean Plate 389, *390*, *391*, *393*, 394–395, *395*
 southward subduction and collision of North American Plate 385, 386, 389, *390*, *391*, *392*, 393–394, *393*, *395*
 paleogeographic evolution 455–457, *456*
 sediment thickness 395–396, *396*, *403*, *405*, **406**, 409, 412, 414–419, *416*, *417*, *418*
 source rocks **412**, 419–424, 439, **449**, 450, 472–473, *474*
 stratigraphy *407*, 408–409, 451–457, *452*, *453*, *456*
 tectonic and geological setting 401–403, *402*, *438*, *439*–*442*, *440*, *441*, *443*
see also San Pedro Basin
- Hispaniola Basin 415, 419
- Hispaniola Fault Zone *481*, *487*
- Hispaniola Microplate 379, *380*, *395*, *396*, 402, *402*, 403
- Hockley Salt Dome 30, 33
- Houston magnetic anomaly 30, 37, 61
- Huayacocotla Belt 45
- Huayacocotla Embayment 30, 46, 48–49, 62
- Huehuetepc Formation 33, 49
- Huiznopala Gneiss 45
- illite ⁴⁰Ar–³⁹Ar dating 319–320, 329–332, **330**, *331*, *332*
- integrated plate tectonics and structural geology of southern Mexico 285–310, 286, 287
- Chiapas Fold and Thrust Belt 285, 286, 287
 chronological summary of the tectonic events 307, *309*
 conclusions and inferences 307–310
 data sources 288–289
 plate tectonic setting 289, *290*, *291*
 stratigraphy 291–292, *292*
 structural restorations 301–307, *303*, *305*
- Cuicateco Belt/Veracruz Basin 285, 286, 287, 288
- Chivillas Basin 289, *290*, *292*, *292*, 299, 300–301, *300*, *301*, *307*, *308*
 chronological summary of the tectonic events 307, *308*
 conclusions and inferences 307–310
 data sources 288–289
- Late Cretaceous–Eocene shortening 293, 294–296, *295*, *296*, *297*
 major faults 294, *296*
- Oaxaca Fault 286, 293, 294, 295, *296*, 297–298, *297*, *298*, 299, 300, 301, *307*, *308*
 plate tectonic setting 289, *290*, *291*

- integrated plate tectonics and structural geology of southern Mexico (*Continued*)
 platform carbonates 290, 293, 297, 300, 301, 302
 Sierra de Juárez mylonite complex 286, 288, 294, 296, 297, 298, 298, 299–300, 299, 300, 308
 stratigraphy 289–291, 292
 structural restorations 292–301, 293, 295, 297, 299, 300
 tilting of Sierra de Juárez and Veracruz Basin 296–297
- Isthmian Salt Basin 3, 188, 189–192, 190, 191
 diapirs and fold and thrust subdomain 188, 190, 191–192, 191
 growth faults and rollover systems subdomain 188, 190, 191, 191
 tilted blocks subdomain 188, 190, 191
- Ixtapa Formation 316, 317, 318, 321
- Jaltepetongo Formation 287, 289, 290, 290, 291, 292, 294, 301, 307
- Jamaica, Cretaceous geology and tectonic assembly 507–539, 508, 510
 Cenozoic tectonic units 510, 511
 crustal structure across terrane boundaries 356, 358, 359–360
 Nicaragua Rise 369, 508, 509, 515, 517–518, 517, 533
 Northeast Blue Mountains Terrane 510, 511, 512–514, 512, 513
 assembly of terranes 535–537, 538
 CLIP rocks 533, 535
 petroleum geology 514
 petroleum geology 369, 510, 537–539
 Northeast Blue Mountains Terrane 514
 Southeast Blue Mountains Terrane 515
 Western Blue Mountains Terrane 518
 Western Jamaica Terrane 520, 521, 522–524, 527–528, 532–533, 537–539
 regional geology 508–509
 Southeast Blue Mountains Terrane 510, 511, 512, 513, 514–515, 515
 assembly of terranes 535–537, 538
 CLIP rocks 515, 533, 535, 537
 petroleum geology 515
 tectonic model 534–535
 assembly of terranes 535–537, 537, 538
 CLIP rocks 509, 515, 533, 535, 536, 537, 537
 continental fragments 534
 island arc rocks 517–518, 524–525, 534
 metamorphic rocks 516–517, 516, 533–534
 Western Blue Mountains Terrane 510, 511, 512, 513, 515–518
 assembly of terranes 535–537, 538
 granodiorites 517–518, 517
 island arc rocks 517–518, 534
 metamorphic rocks 516–517, 516, 533–534
 petroleum geology 518
 Western Jamaica Terrane 510, 511, 512, 518–533
 assembly of terranes 535–537, 538
 Campanian 512, 524–528, 524
 Cenomanian to Santonian 512, 519, 521–524, 523, 524
 island arc rocks 518, 524–525, 534
 Lower Cretaceous 512, 518–521, 519, 520
 Maastrichtian to early Paleocene 512, 528–533, 529, 530, 531
 petroleum geology 520, 521, 522–524, 527–528, 532–533, 537–539
- Jericho Formation 524, 526
 Jerusalem Formation 530, 531
 Jerusalem Mountain Inlier, Jamaica 510, 528, 530, 531
 Jimani Formation 453, 455
- Johns Hall Formation 524, 525
 Jolpabuchil Formation 316, 317, 318, 320
 Juana Diaz Formation 407, 409, 411, 412, 413, 424, 428
 Jubilee Formation 518, 519
- Kelliits Synthem 511, 512, 527, 528–533, 529, 530, 531, 535, 536, 539
- Kennington Formation 531
- La Joya Formation 237
 La Mora Formation 103–105
 La Perla Field 369
 La Quinta Formation 51
 La Venta–Grijalva–Paso Hondo Fault 318, 320, 321, 323, 327, 328
 Lalail-1 well 133, 143
 Lamprea Fold Belt 10
 Lara Nappes 49–51
 Laramide Orogeny 10, 126, 129, 132, 136–137, 139, 170, 225, 285
 Lares Limestone Formation 407, 409, 411, 413
 Las Hormigas anticline 467, 468, 468
 Las Palmas Formation 483, 486
 Las Salinas Formation 407, 408, 453, 455, 456
 Las Trancas Formation 276
 Lechos Rojos Formation 129, 130, 136
 Liberty Hall Formation 522, 523, 524
 Lomut Formation 316, 317, 318
 Los Guiros syncline 468–470, 469, 470
 Los Puertos Limestone 407, 409
 Louann Formation 85, 130, 148, 150, 236, 243
 Lucea Inlier, Jamaica 510, 524, 524, 526–527, 528, 536
- Macuspana Basin 11, 13, 127, 133, 135, 140, 154, 158
 Macuspana Formation 129, 137
 Mahoe River Formation 529, 532
 Maldon Formation 531
 Maldon Inlier, Jamaica 510, 529, 531
 Maleno Field 482
 exploration activities 443, 444–448, 450, 480, 480, 487
 geochemistry 470–473, 471, 472, 473, 474, 474
 reservoirs 472–473, 474, 489, 489, 490, 494
 seals 489, 492
 source rocks 472–473, 474, 487, 488, 488, 489
 structure and stratigraphy 459, 465–468, 465, 466, 467, 468
 traps 474, 487, 489, 492
- Malpaso–Aztlán Fault 318, 323, 327, 328, 333
 Manzanillo Terrane 509
 Marathon Thrust Belt 30, 45, 46, 62
 Marchmont Inlier, Jamaica 510, 531, 532
 Masemure Formation 530, 531
 Mata Espino-101B, Veracruz Basin 30, 33, 48–49
 Maya Block *see* Yucatán Block
 Mayrán Basin 270, 272–273, 278, 279, 279, 280
 Mazateco Schist 42, 44, 44, 45
 Mesa Central 9
see also thermotectonic history of eastern Mexico
 Mesquito Composite Oceanic Terrane 509
see also tectonic terranes underlying Caribbean Plate
 Mexican Fold and Thrust Belt 3, 6–9, 8, 13, 124, 132, 139, 151–152, 153, 154, 162, 315, 316, 333
 Mexican Foreland Basin 6, 8, 9–10
 Mexican Orogeny 6–9, 8
see also thermotectonic history of eastern Mexico
 Mexican Ridges Fold Belt 9, 10–11, 13, 184, 188, 191, 192, 208
- Mexico–Colombia overlap problem 39, 41–42
 Middle Ground Arch/ Southern Platform 80, 81, 85, 96, 101

- Middlesex Formation 524, 526
 Minas Viejas Formation 33, 48
 Mint Formation 528, 530
 Mixtequita Massif 30, 45
 Mojave–Sonora Megashear 30, 41, 61
 Mompuyil Formation 316, 317, 318
 Motagua Fault 290, 291, 305, 306, 316, 316, 533–534
 Mount Diablo Inlier, Jamaica 510, 518–521
 Mount Peace Formation 524, 526
 Mt Hibernia Schist 516, 517, 533
 Muertos Thrust Belt 481, 482, 483, 484, 487, 496, 500
 Muertos Trench 347, 350, 356–357, 357, 359, 360, 361, 362, 363, 366, 366, 368, 379, 386, 389, 390, 394–395, 402, 402
- Nanchital conglomerate, provenance of 167–180, 168
 data and methods 171–173, 173
 geological framework 169–171, 171, 172
 implications for Sureste Basin reservoirs 180
 interpretation of results 175–178
 radiometric dating results 173–175, 174, 176
 schematic cross-sectional model 178–180, 179
- Nazas Arc 43, 48, 52, 53, 54, 55, 63
 Negril Spots-1 well 510, 527, 528, 530, 531, 531, 532, 539
 Neiba Formation 407, 408, 410, 426
 Newmans Hall Formation 524, 525, 528
 Nicaragua Rise 346, 353, 355, 356, 358, 360, 361, 363, 364, 365, 366, 367, 369, 508, 509, 515, 517–518, 517, 533
 Norphlet Formation 5, 103–105, 106, 130, 135, 136, 233–234, 234, 237, 242–243, 242, 244, 245–246, 247, 248, 249, 250
 North American Plate, southward subduction and collision of 385, 386, 389, 390, 391, 392, 393–394, 393, 395
 North Chiapas Volcanic Arc 11
 North Coast Basin, Puerto Rico
 basal structure 402, 403, 404–408
 burial history 421, 422, 427–428
 depth to basement and sediment thickness 405, 414, 419, 422
 petroleum prospectivity and potential 413, 430
 source rocks 412, 424
 stratigraphy 407, 409
 North Florida tholeiite province 80, 81, 88, 101
 North Florida Volcanic Series 80, 82, 88, 89
 North Hispaniola Microplate 379, 380, 395, 396, 402, 402
 North Hispaniola Trench 386, 387, 388, 389, 393
 North Oaxaca Transfer Zone 30, 42–45, 43, 44, 46, 61, 62, 64
 North Panama Deformed Belt 347, 363
 Northeast Blue Mountains Terrane 510, 511, 512–514, 512, 513
 assembly of terranes 535–537, 538
 CLIP rocks 533, 535
 petroleum geology 514
- Oaxaca Block 3, 30, 42, 44–45, 46, 48, 60–61, 62–63, 64, 286, 287, 288, 290, 290, 291, 291, 293, 294, 295, 296, 297, 300, 300, 301
 Oaxaca Fault 42, 43, 286, 293, 294, 295, 296, 297–298, 297, 298, 299, 300, 301, 307, 308
 Oaxaquia 42, 45, 64
 Oca Fault 49
 Ocoa Bay 450, 454, 457, 459, 463–465, 464, 473, 474
 Ocoa Formation 483, 484, 485, 486
 Ocozacoatlán Formation 316, 317, 318, 320, 321
 Osceola granitic province 80, 82, 88–89, 90
 Otates Formation 129, 132
 Ouachita–Marathon Thrust Belt 30, 45, 46, 62
 Oxfordian Bacab sandstones, Gulf of Mexico 5, 233–250, 234
- data and methods 235–236, 235
 depositional palaeoenvironment interpretation 240–242, 240, 241
 detrital zircon U–Pb geochronology 246–247, 246, 247
 palaeogeographical reconstruction 241, 248–249, 248
 provenance 245–247, 246, 247
 reservoir description 238, 239–240, 239, 240
 reservoir quality 238, 243–245, 244, 245
 stratigraphy 236–237, 236
 structural setting 237–239
- Paraguán Peninsula, Venezuela 49–51
 Paso Hondo Formation 316, 317, 318
 Peckham Formation 529, 532
 Perdido Fold Belt 3, 10, 13, 158
 Perijá Range 49
 Pescadores Trough 11, 13, 126, 127, 132, 134, 135, 136, 137, 140, 141, 158
 Peters Hill Formation 524, 525
 Pioneer Formation 524, 526
 Plateau Central Basin *see* San Juan/Plateau Central Basin
 Polochic Fault 290, 291, 305, 306, 316, 327–329, 333
 Ponce Limestone Formation 407, 409, 411, 413, 425
 Poza Rica Field 121
 Proto-Caribbean Seaway 58, 64, 65
 Providence Formation 513, 514
 Puerto Rico
 basal structure 402, 403, 404–408
 burial history 421, 422, 423, 427–428
 crustal structure across terrane boundaries 357, 360, 361
 depth to basement and sediment thickness 405, 414, 415, 419, 422, 423
 geochemical analysis of source rocks
 data 409, 411, 412, 413
 methods and results 412–413, 414, 415, 419, 424–426
 petroleum prospectivity 395–396, 396
 petroleum prospectivity and potential 413, 430
 source rocks 412, 424
 stratigraphy 407, 409
 Puerto Rico and Virgin Islands Microplate 379, 380, 395, 396, 402, 402, 403
 Puerto Rico Trench 386, 390, 393, 402, 402, 405
- Quebradillas Formation 407, 409
 Quita Coraza anticline 468–470, 469, 470
 Quita Coraza Formation 407, 408, 411, 412, 449, 452, 453, 454–455, 457, 460, 460, 461–462, 461, 462, 463, 464, 465, 466, 468, 469
- radiometric dating
 apatite fission track dating 6, 9–10, 177, 180, 257–267, 257, 259–261, 262–264, 265, 266, 268, 306, 333
 apatite (U–Th)/He thermochronometry 257–258, 257, 262–264, 265, 266, 306
 illite ⁴⁰Ar–³⁹Ar dating 319–320, 329–332, 330, 331, 332
 zircon (U–Th)/He thermochronometry 257–258, 257, 262–264, 265, 266
see also zircon U–Pb dating
- Retrieve-1 well 520, 520, 521, 522, 524, 527, 536, 537, 539
 Río Fuerte Quartzite 61
 Río Grande Formation 512, 513–514, 513
 Río Hondo Group 316, 317, 318, 321
 Río Nuevo Formation 518–520, 519, 521–522, 539
- Sabine Uplift 30, 32, 37, 62, 65
 Salina del Bravo 3, 5, 10
 Saltillo–Torreón Fault 41
 San Cayetano Formation 105, 248, 249

- San José–Restauración Fault Zone *481, 484, 485–487, 485, 486, 496*
- San Juan–Los Pozos *440, 443, 451, 455, 459, 460–461, 461, 465*
- San Juan–Los Pozos Fault Zone *481, 484, 486, 487*
- San Juan/Plateau Central Basin *441, 443, 457–459, 458*
 basinal structure *402, 403, 451, 452*
 burial history *417, 426*
 depth to basement and sediment thickness *395–396, 396, 405, 414, 415, 417*
 exploration activities *442, 444–448, 449, 450*
 paleogeographic evolution *455–457, 456*
 petroleum prospectivity and potential **413**, *429, 430–431, 449*
 source rocks **412**, *419–424, 449*
 stratigraphy *407, 408, 452, 454*
- San Marcos Fault *41, 46*
- San Pedro–1 well *488, 488, 489, 492, 493, 494, 499*
- San Pedro Basin
 hydrocarbon potential/exploration *479–498*
 basin evolution *482–487, 483, 484, 485, 486*
 data and methods *481–482, 482*
 geological setting *480–481, 481*
 previous onshore exploration *479–480, 480, 487, 488, 489*
 reservoirs *489–491, 491, 493–496, 495*
 seals *491–492, 496*
 source rocks *487, 488–489, 488, 490, 491, 492–493, 493, 494*
 traps *492, 493, 496, 497*
 sediment thickness *415, 419*
- San Ricardo Formation *291, 292, 316, 317, 318, 320*
- San Sebastian Formation *407, 409, 411, 412, 413, 424, 425, 427, 430*
- Santa Ana Field *121*
- Santa Ana High *30, 45*
- Santa Marta Massif *49, 60*
- Santa Rosa Formation *316, 317, 318*
- Saona Transpressive Fault Zone *485, 487, 496, 497*
- Sarasota Arch *80, 81, 86, 96, 99, 101, 102*
- Seafield Formation *518, 519, 520*
- Septentrional Fault Zone *379, 380, 387, 388, 392, 393, 402, 404*
- Shepherds Hall Formation *528*
- Siempre Viva Fault *286, 294, 299, 300*
- Sierra de Juárez mylonite complex *286, 288, 294, 296, 297, 298, 298, 299–300, 299, 300, 308*
- Sierra de Juárez Mylonitic Belt *42–44, 43, 44, 45, 64*
- Sierra Madre Group *291, 292, 316, 317, 318, 320, 321, 325*
- Sierra Madre Oriental *6, 8, 30, 46, 65, 194*
see also thermotectonic history of eastern Mexico
- Sigsbee Abyssal Plain *184, 188, 192*
- Siuna/Mesquito Composite Oceanic Terranes *509*
see also tectonic terranes underlying Caribbean Plate
- Siuna Terrane *508, 533, 534, 535, 536*
- Slippery Rock Formation *528, 529*
- Smackover Formation *130, 135, 136, 237, 242, 243, 249*
- Sombrito Formation *407, 408–409, 410, 412, 413, 414, 419–424, 425–426, 428, 429, 431, 449, 450, 451–454, 452, 453, 456–457, 456, 458, 459, 460, 460, 461, 462, 463, 464, 465, 466, 467, 468, 468, 471, 472, 473, 474*
- South Caribbean Deformed Belt *345, 347, 356–357, 357, 358, 359, 360–363, 366, 366, 367, 368, 369*
- South Coast Basin, Puerto Rico
 basinal structure *402, 403, 408*
 burial history *423, 428*
 depth to basement and sediment thickness *405, 415, 419, 423*
 petroleum prospectivity and potential **413**, *430*
 source rocks **412**, *424*
 stratigraphy *407, 409*
- South Florida Basin *80, 81, 86–87, 93, 100, 101, 102, 103, 105, 106*
- South Georgia Embayment *38, 66*
- South Georgia Rift *30, 48, 52, 62, 80, 81, 88, 101, 102, 103*
- Southeast Blue Mountains Terrane *510, 511, 512, 513, 514–515, 515*
 assembly of terranes *535–537, 538*
 CLIP rocks *515, 533, 535, 537*
 petroleum geology *515*
- Southeast Georgia Embayment *80, 82, 87, 96–98, 100*
- Soyaló Formation *316, 317, 318, 321, 332, 335*
- Soyatal Formation *9*
- St Ann's Great River Inlier, Jamaica *510, 510, 522, 523, 524, 524, 527–528*
- St Lucie Metamorphic Complex *80, 82, 88, 89, 90*
- Stapleton Formation *524, 525–526, 527*
- Strawberry Formation *528, 530*
- Sub Yellow Limestone unconformity *528, 529, 530, 537*
- Summerfield Group *529, 531, 532*
- Sunderland Formation *524, 525, 528*
- Sunderland Inlier, Jamaica *510, 524, 524, 525–526, 528, 529, 531, 536*
- Sunning Hill Inlier, Jamaica *510, 513, 515–516, 517, 518*
- Sureste Basin *9, 11, 12, 119–145, 147–163*
 areal extent *119, 120, 147, 148*
 hydrocarbon potential/exploration
 charge deep focus and charge timing *141–142*
 column height uncertainty *143, 144*
 critical factors for future success *141, 142*
 dry hole analysis *137–139*
 exploration history *121, 122, 123*
 key challenges and uncertainties *141–144*
 locations of oilfields and gas fields *149*
 seals *137*
 source rock maturity *135–136*
 source rocks/petroleum systems *134–135, 135*
 statistical view of future potential *121–123, 124, 125*
 traps *139–141, 140*
- hydrocarbon reservoirs *12, 13, 136–137, 156, 158–160, 168*
- Jurassic clastics *136*
- Mesozoic carbonates *136, 158–159, 160*
- Tertiary carbonates *137*
- Tertiary clastics *136–137, 138, 139, 159–160, 161, 167–169, 180*
- as a Super Basin *119–121*
- tectonostratigraphic framework *123–128, 147–158, 149*
- Campechano Event *128, 128*
- Chiapaneco Event *124–128, 126, 127, 133, 137, 139, 152–158, 152, 155, 156, 157, 162*
- early rifting history *147–151, 150, 151*
- Jurassic–Cretaceous *151, 151, 152, 162*
- Late Tertiary extension and downslope toe compression *126, 127, 140–141, 157, 158, 159, 162*
- Mexican Fold and Thrust Belt Event *124, 132, 139, 151–152, 153, 154, 162*
- tectonostratigraphic response *3–5, 128–134, 129, 131, 133, 134, 142*
- Suwannee Suture *80, 81, 87*
- Suwannee Terrane and Suwannee Basin *80, 82, 87–88, 89, 96–98, 98, 99, 100, 101, 104, 105, 106*
- SW Florida Mesozoic volcanic province *80, 82, 89, 93, 101, 102*
- Swan Island Transform Fault *316*
- synthesis of Gulf of Mexico rift and drift history *29–66, 30, 32*
 Bajocian age salt deposition *32–33, 36, 37*

- Equatorial Atlantic reconstruction 33–35, **38**, 39
- Mesozoic evolutionary model stage 1 synrift phase
- Bathonian reconstruction 54, 62–63
 - Toarcian reconstruction 53, 61–62
 - Triassic–Bathonian overview 51, 52, 53, 54, 60–61
- Mesozoic evolutionary model stage 2 drift phase
- early Aptian reconstruction 59, 65
 - early Valanginian reconstruction 58, 65
 - Kimmeridgian reconstruction 56, 64
 - Oxfordian reconstruction 55, 63–64
 - Tithonian reconstruction 57, 64–65
- plate kinematic framework 33–35, **38**, 39
- pre-Mesozoic block reconstruction of the northern Andes 49–51, 50, **51**, 61
- rifting and block motions in cordilleran Mexico
- crustal extension model for ‘peninsular Mexico’ 30, 39, 45–49, 46, 47, 60
 - Mexico–Colombia overlap problem 39, 41–42
 - North Oaxaca Transfer Zone 30, 42–45, 43, **44**, 46, 61, 62, 64
 - rifting in Florida–Bahamas peninsula 35–41, 40
 - rotation of Yucatán 31–32, 32, 34, 34, 35, 36, 37, **38**, 39, 49, 60, 61, 62, 63, 65
- Tabera Group 404, 404, 420, 427, 430
- Tamaulipas Arch 9, 10, 35, 41, 46, 63
- Tamaulipas Formation 289, 290, 292, 307
- Tampa Basin 80, **81**, 85–86, 99, 101, 102
- Tampico–Misantla Basin 6, 8, 9, 10, 11, 13, 30, 33, 49, 256, 270, 274–275, 278–279, 279, 280
- Tecpatán–Ocosingo Fault 318, 323, 327, 328, 329
- tectonic terranes underlying Caribbean Plate 343–370, 344
- basement characteristics 348, 349, 350, 351, 353–358
 - crustal structure across terrane boundaries 356–357, 358–361, 358, 359, 360
 - data and methods 346, 347, 348, 349, 350–352, 350, 351, **352–353**, **354**, **355**
 - depth to basement and sediment thickness 361–363, 362
 - hydrocarbon distribution and 367–370, 368
 - subduction-related flexure modelling 366–367, 366
 - subsidence histories 363–367, 364, 366
- Tehuantepec Transform Fault 126, 152
- Tenosique Fault 321, 323, 327, 328
- Teotitlán Migmatitic Complex 43, 44, **44**, 45
- Texexilota Formation 290, 292
- thermotectonic history of eastern Mexico 255–280, 256
- discussion of results 270–278
 - HeFTy modelling 265, 267–269, 269
 - HeFTy modelling results 270, 271, 272–273, 274–275, 276, 277
 - implications for sediment delivery to Gulf of Mexico 278–280
 - Mayrán Basin 270, 272–273, 278, 279, 279, 280
 - samples 257–258, 257, **259–261**, **262–264**
 - Tampico–Misantla Basin 256, 270, 274–275, 278–279, 279, 280
 - thermochronological data 258–265, **259–261**, **262–264**, 265
 - thermochronological results **259–261**, **262–264**, 265–267, 266, 268
- Thicket River Formation 530, 531, 532
- Thomas River Formation 529, 531
- Thornton Formation 513, 515–516
- Tiber Formation 519, 522
- Tireo Group 482, 486
- Todos Santos Formation 169, 177, 178, 237, 247, 248, 290, 291, 292, 294, 303, 304, 305, 307, 316, 317, 318, 320
- Tom Spring Formation 524, 526
- Tonalá Shear Zone 170, 177, 178, 179, 179, 286, 287, 291, 303, 304–306, 305, 307, 309, 327
- Torreón–Monterrey Fault 41
- Torreón–Monterrey fault 46
- Trans-Mexican Volcanic Belt 30, 42, 45, 177
- Trinchera Formation 407, 408, 409, **410**, **412**, **413**, 417, 418, 424, 425, 427, 429, **449**, 450, 452, 453, 454, 455, 456, 457, 459–460, 460, 461, 462, 463–465, 464, 465, 466, 467, 468, 468, 469
- Trinidad 33, 63, 369
- Trois Rivières–Peralta Thrust Belt 482, 483, 483, 484, 485, 487, 492
- Troy Formation 536
- Tson Anhydrite 5, 236, 237, 240, 242, 243
- Tulijá Formation 321, 325, 326
- Tuxtla–Socoltenango Fault 318, 320, 321, 323, 325, 327, 328, 333
- Valle Nacional Fault 290, 294, 300
- Vaughansfield Formation 531
- ‘Veniella Shales’ 532
- Veracruz Basin 8, 9, 11, 13, 30, 33, 42, 48–49, 128, 128, 132, 140
- see also* integrated plate tectonics and structural geology of southern Mexico
- Veracruz/Los Tuxtlas left-lateral shear *see* Campechano Event
- Via Formation 452, 453, 455, 457, 459, 460, 460, 461, 462, 463, 464
- Villa Alta Fault 43, 45, 46, 286, 290, 294, 307
- Vista Hermosa Fault 286, 290, 294, 295, 300, 307, 308
- Wag Water Trough 510, 516, 536
- Waterworks Formation 529, 532
- West Florida Terrane 77–107
- data and methods 79–84, 80, 84, 107–108
 - discussion of results
 - origin of Florida Transfer Zone 100–102, 101
 - origin of West Florida Terrane 96–100, 97, 98
 - provenance of detrital zircons 103–106, 104
 - timing of igneous activity and accommodation 101, 102–103
 - previous studies 78–79
 - radiometric dating
 - data and methods 79–84, 107–108
 - detrital zircon ages 93–95, 95, 96, 97
 - zircon ages of igneous rocks 89–93, 93, 94, 97
 - seismic lines 84, 89, 90, 91, 92
- tectonic elements and crustal terranes **81–82**
- Apalachicola/Desoto Canyon Basin 80, **81**, 85, 101, 102
 - Catoche Knoll 80, **82**, 98, 98, 100, 101
 - Florida Straits Basin 80, **82**, 89, 90, 91, 92, 101
 - Florida Transfer Zone 80, **82**, 85, 87, 89, 100–102, 101, 104
 - Middle Ground Arch/ Southern Platform 80, **81**, 85, 96, 101
 - North Florida tholeiite province 80, **81**, 88, 101
 - North Florida Volcanic Series 80, **82**, 88, 89
 - Osceola granitic province 80, **82**, 88–89, 90
 - Sarasota Arch 80, **81**, 86, 96, 99, 101, 102
 - SE Georgia Embayment 80, **82**, 87, 96–98, 100
 - South Florida Basin 80, **81**, 86–87, 93, 100, 101, 102, 103, 105, 106
 - South Georgia Rift 80, **81**, 88, 101, 102, 103
 - St Lucie Metamorphic Complex 80, **82**, 88, 89, 90
 - Suwannee Suture 80, **81**, 87
 - Suwannee Terrane and Suwannee Basin 80, **82**, 87–88, 89, 96–98, 98, 99, 100, 101, 104, 105, 106

- West Florida Terrane (*Continued*)
 SW Florida Mesozoic volcanic province 80, **82**, 89, 93, 101, 102
 Tampa Basin 80, **81**, 85–86, 99, 101, 102
 Wiggins/Hancock Arch 80, **81**, 98, 99, 100
- West Negril-1 well 510, 527, 528, 530, 531–532
- Western Blue Mountains Terrane 510, 511, 512, 513, 515–518
 assembly of terranes 535–537, 538
 granodiorites 517–518, **517**
 island arc rocks 517–518, 534
 metamorphic rocks 516–517, **516**, 533–534
 petroleum geology 518
- Western Jamaica Terrane 510, 511, 512, 518–533
 assembly of terranes 535–537, 538
 Campanian 512, 524–528, 524
 Cenomanian to Santonian 512, 519, 521–524, 523, 524
 island arc rocks 518, 524–525, 534
 Lower Cretaceous 512, 518–521, 519, 520
 Maastrichtian to early Paleocene 512, 528–533, 529, 530, 531
 petroleum geology 520, 521, 522–524, 527–528, 532–533, 537–539
- Westphalia Schist 516, **516**, 517, 536
- White Limestone Group 510–511, 510, 520, 536, 537
- Whitehall Inlier, Jamaica 510, 515–516
- Wiggins Arch 30, 32, 33, 37, 40, 60, 80, **81**, 98, 99, 100
- Windsor-1 well 510, 520, 520, 521, 522, 534, 536, 537, 539
- Windsor Formation 522, 523
- Xonamanca Formation 290, 292
- Yaque Group 404, 427
- Yellow Limestone Group 520, 527, 537
- Yucatán Block 3, 86, 98–99, 98, 100, 101, 104, 105, 183, 247, 508, 534, 536, 537, 538, 539
 rotation of 3, 11, 31–32, 32, 34, 34, 35, 36, 37, **38**, 39, 49, 60, 61, 62, 63, 65, 123, 136, 184, 204
- Yucatán margin 203–228, 204, 249
 evolution and tectonic history 204–205, 204
 geological setting 205–208, 206, 207
 source rock types 210–212
 structural and stratigraphic trends 207, 212–216, 213, 214, 215, 216, 217
 thermal maturity modelling and burial history
 data and methods 205, 207, 208–212, **209**, 211
 implications for hydrocarbon prospectivity and potential 222–228, 224, 225, 227
 results and interpretation 216–222, 218, 219, 220, 221, 222, 223
- Yucatán Platform 119, 120, 132, 136, 150, 160, 184, 187–189, 188
- Yucatán Salt Basin 3, 119
- Zama Field 122–123, 132, 134, 134, 137, 141, 142, 149, 167–169, 168, 177, 178
- Zapotitlán Formation 291, 292
- zircon U–Pb dating
 Cuicateco Belt 42, 43, 44, **44**, 299
 granodiorites, Jamaica 517, **517**
 metamorphic rocks, Jamaica 533
 Nanchital conglomerate 173–175, **173**, **174**, 176
 northern Andes 49, **51**
 Oxfordian Bacab sandstones 246–247, 246, 247
 West Florida Terrane
 data and methods 79–84, 107–108
 detrital zircon ages 93–95, 95, 96, 97
 provenance of detrital zircons 103–106
 zircon ages of igneous rocks 89–93, 93, 94, 97
 zircon (U–Th)/He thermochronometry 257–258, 257, **262–264**, 265, 266