APPENDICES

APPENDIX 1

	Thesis Numbering	Survey Numbering	Line trend
British Petroleum,	1	SW88-16	NW-SE, dip
Sector A	2	SW88-12	NE-SW, strike
Neuchatel Jura	3	SW88-14	NW-SE, dip
	6	SW88-04W	NE-SW, strike
	5	SW88-15	NW-SE, dip
	4	SW88-04E	NE-SW, strike
	7	SW88-01	NW-SE, dip
	8	SW88-17	NE-SW, strike
	9	SW88-09	NW-SE, dip
	10	SW88-11	NE-SW, strike
	11	SW88-07	NW-SE, dip
	12	SW88-18	NE-SW, strike
	13	SW88-06	NW-SE, dip
	14	SW88-10	NE-SW, strike
	15	SW88-20	NW-SE, dip
	17	SW88-03	NW-SE, dip
	19	SW88-19	NW-SE, dip
Shell Switzerland	20	73VD01	NE-SW, strike
and SADH	21	73VD04	NW-SE, dip
Sector B	22	73VD02-73VD34	NE-SW, strike
Molasse Basin	23	74VD33	NW-SE, dip
	24	74VD35	NE-SW
	25	74VD30	NE-SW
	26	78SADH21	NE-SW
	27	73VD05-74VD36-74SADH08	NW-SE, dip
	28	76SADH18	NE-SW, strike
	29	78SADH22	NW-SE
	30	79SADH27	NE-SW
	31	74VD31	NW-SE, dip
	32	72SADH07	NE-SW, strike
	33	74VD29	NW-SE, dip
	34	74VD38-74SADH09	NNE-SSW
	35	74VD40	NW-SE, dip
	36	74SADH14	N-S
	37	73VD06	NW-SE, dip
	38	75VD55	N-S
	39	73VD07	WNW-ESE
	40	76SADH15	NNW-SSE
	41	74SADH11	NW-SE
	42	73VD23	NE-SW
	43	79SADH24	NW-SE
	44	73VD21-73VD18	NNE-SSW
	45	76SADH16	WNW-ESE
	46	74SADH06-74VD52-N6	NE-SW, strike
	47	76SADH17	NNW-SSE
	48	76VD57	N-S
	49	76VD67	NW-SE

Appendix 1 (pages 157, 158): Inventory of seismic lines. Sector A, B, C, D refers to Figure 1.4.

Inventaire des profils sismiques. Se référer à la Figure 1.4 pour la définition des secteurs A, B, C, D.

	50	76VD58	strike, NE-SW
	51	76VD69	N-S
	52	78VD81	NE-SW
	53	73VD26	NW-SE, dip
	54	78VD76	NE-SW
	55	73VD24	NW-SE, dip
	57	73VD19	NW-SE, dip
	59	73VD22	NW-SE, dip
	61	73VD25	NW-SE, dip
	63	73VD14	NW-SE, dip
	65	73VD20	NW-SE, dip
	67	73VD15	NW-SE, dip
	69	73VD16	NW-SE, dip
	71	73VD17	NW-SE, dip
	22-34-	73VD02-73VD34-74VD38-74SADH09-	NNE-SSW
	46-44	74SADH06-74VD52-N6-73VD18	NNE-SSW
	35-37-39	74VD40-73VD06-73VD07	NW-SE
	42-32-20-22	73VD23-72SADH07-73VD01-73VD02	NE-SW, strike
	50-48-34-39	76VD58-76VD57-74SADH09-74VD38-{-73VD07}	S-N after W-E
Shell	80	74VD49	NE-SW, strike
Sector C	81	74VD48	NW-SE, dip
Mt-Risoux	82	74VD44	NE-SW, strike
	83	74VD42	NW-SE, dip
	84	73VD09-74VD53-73VD10	NE-SW, strike
	85	74VD45	NW-SE, dip
	86	73VD12	NE-SW, strike
	87	73VD08	NW-SE, dip
	88	73VD13	NE-SW, strike
	89	74VD46	NW-SE, dip
	91	72M2	NW-SE, dip
	93	74VD43	NW-SE, dip
	95	74VD41	NW-SE, dip
	111	CM7	NW-SE, dip
	93-95-61	73VD43-73VD41-73VD25	NW-SE, dip
	89-91-55	74VD46-72M2-73VD24	NW-SE, dip
	111-85-87-91-55	CM7-74VD45-73VD08-72M2-73VD24	NW-SE, dip
Shellrex	100	CM20-CM20N	strike
Sector D	101	CM13	dip
Champagnole-	102	CM19Sud-CM19Nord	strike
Mouthe	103	CM1	dip
	104	CM11-CM11Nord	strike
	105	CM42	dip
	106	CM3Sud-CM3centre-CM3Nord (à double)	strike
	107	CM4	dip
	108	CM5-CM5Sud-CMV7	strike
	109	CM6	dip
	110	CM10	strike
	111	CM7	dip
	112	CM2	strike
	113	CM16Nord	dip
	115	CM16Sud	dip
	117	CM17	dip
	119	CM18	dip
	121	CM9	dip
	123	CMV6	dip
	125	CM14	dip

Appendix 1 (pages 157, 158): Legend on page 157.

Légende à la page 157.

APPENDIX 2

exploration company

1) Courtion BP, 1960 T.D. = 3083m

elevation	x	y
599m	572'415m	189'420m

top of ... Formation	depth m	elevation m	thickness m
Tertiary	0	599	1322
Cretaceous	-1322	-723	112
Malm	-1434	-835	388
Argovian	-1822	-1223	216
Dogger	-2038	-1439	400
Aalenian	-2438	-1839	152
Liassic	-2590	-1991	100
Keuper	-2690	-2091	180
MK dolom.	-2870	-2271	63
MK evap.	-2933	-2334	150
T.D.	-3083	-2484	

Fischer & Luterbacher 1963

3) Hermrigen Elf Aquitaine, 1982 T.D. = 2198m

elevation	x	y
480m	587'790m	214'900m

top of ... Formation	depth m	elevation m	thickness m
Tertiary	0	480	395
Cretaceous	-395	85	8
Malm	-403	77	436
Argovian	-839	-359	239
Dogger	-1078	-598	380
Aalenian	-1458	-978	92
Liassic	-1550	-1070	177
Keuper	-1727	-1247	280
MK dolom.	-2007	-1527	79
MK evap.	-2086	-1606	112
T.D.	-2198	-1718	

Housse 1982

exploration company

2) Tschugg KUS, 1976 T.D. = 704m

elevation	x	y
463m	572'610m	207'910m

top of ... Formation	depth m	elevation m	thickness m
Tertiary	0	463	509
Cretaceous	-509	-46	129
Jurassic	*-638*	*-175*	*66*
T.D.	-704	-241	

Schnegg 1992

4) Essertines SADH, 1963 T.D. = 2936m

elevation	x	y
660m	539'775m	173'490m

top of ... Formation	depth m	elevation m	thickness m
Tertiary	0	660	337
Cretaceous	-337	323	194
Malm	-531	129	501
Argovian	-1032	-372	314
Dogger	-1346	-686	406
Aalenian	-1752	-1092	153
Liassic	-1905	-1245	397
Keuper	-2302	-1642	634
T.D.	-2936	-2276	

Büchi et al. 1965b

5) Cuarny Vingerhoets, 1940 T.D. = 2229m

elevation	x	y
562m	543'540m	180'380m

top of ... Formation	depth m	elevation m	thickness m
Tertiary	0	562	480
Cretaceous	-480	82	240
Malm	-720	-158	1240
Dogger	-1960	-1398	269
T.D.	-2229	-1667	

Althaus & Rickenbach 1947

Appendix 2 (pages 159-162): Compilation of well data as found in the literature or in unpublished reports. Lithologies and abbreviations are explained at the end of the table. Drilling company and year are mentioned for each hole. Total depth (T.D.) corresponds to the depth reached and corrected for deviations from vertical. Elevations are indicated above or below (-) sea level. Location coordinate X and Y refers to the Swiss coordinate system. All data are in meters.

Données de forages compilées de la littérature ou de rapports non publiés. Les lithologies et les abréviations sont expliquées à la fin de cet annexe. Les compagnies et l'année de forage sont mentionnées pour chaque puits. La profondeur (T.D.) correspond à la profondeur maximale atteinte et corrigée par rapport aux déviations de la verticale. Les altitudes sont indiquées par rapport au niveau de la mer. Les coordonnées X et Y se réfèrent au système suisse de coordonnées géographiques. Toutes les données sont en mètres.

6) Treycovagnes Shell, 1978 T.D. = 3221m

elevation		x	y
473m		536'135m	180'273m

top of ... Formation	depth m	elevation m	thickness m
Cretaceous	0	473	177
Malm	-177	296	514
Argovian	-691	-218	203
Dogger	-894	-421	404
Aalenian	-1298	-825	66
Liassic	-1364	-891	308
Keuper	-1672	-1199	858
MK dolom.	-2530	-2057	30
MK evap.	-2560	-2087	121
Buntsandstein	-2681	-2208	62
Permian	-2743	-2270	478
T.D.	-3221	-2748	

Report deposited at the Musée géologique du Canton de Vaud in Lausanne; Schegg et al. 1997

8) Savigny SADH, 1960 T.D. = 2486m

elevation		x	y
839m		546'271m	155'312m

top of ... Formation	depth m	elevation m	thickness m
Tertiary	0	839	2331
Cretaceous	-2331	-1492	155
T.D.	-2486	-1647	

Lemcke 1963

10) Risoux PREPA, 1960 T.D. = 1958m

elevation		x	y
1350m		500'310m	161'020m

top of ... Formation	depth m	elevation m	thickness m
Upper Malm	0	1350	123
Argovian	-123	1227	205
Dogger	-328	1022	125
Argovian	-453	897	129
Dogger	-582	768	160
Aalenian	-742	608	15
Lias	-757	593	218
Lias	-975		259
Malm	-1234	116	265
Argovian	-1499	-149	417
Dogger	-1916	-566	42
T.D.	-1958	-608	

Winnock 1961

7) Chapelle SADH, 1958 T.D. = 1540m

elevation		x	y
764m		547'305m	168'359m

top of ... Formation	depth m	elevation m	thickness m
Tertiary	0	764	1506
Cretaceous	-1506	-742	25
T.D.	-1531	-767	

Lemcke 1959

9) Laveron PREPA, 1959 T.D. = 2485

elevation		x	y
1080m		503'000m	180'600m

top of ... Formation	depth m	elevation m	thickness m
Malm	0	1080	266
Raur. /Argov.	-266	814	243
Dogger	-509	571	220
Aalenian	-729	351	228
Liassic	-957	123	118
Rhaetian / Keup	-1075	5	882
Lettenkohle	-1957	-877	23
MK dolom	-1980	-900	63
MK evap.	-2043	-963	377
Buntsandstein	-2420	-1340	65
T.D.	-2485	-1405	

BRGM, Mouthe 1964

11) Eternoz T.D. = 2500m

elevation		x	y
521m		491'800m	207'200m

top of ... Formation	depth m	elevation m	thickness m
Bath./Baj.	0	521	278
Aalenian	-278	243	79
Liassic	-357	164	196
Keuper	-553	-32	456
Lettenkohle	-1009	-488	18
MK dolom.	-1027	-506	57
MK evap.	-1084	-563	131
Buntsandstein	-1215	-694	65
Permian	-1280	-759	1220
T.D.	-2500	-1979	

BRGM, Quingey 1975

Appendix 2 (pages 159-162): Legend on page 159.

Légende à la page 159.

12) Essavilly SNPA, 1964 T.D. = 2067m

elevation	x	y
795m	496'400m	183'000m

top of ... Formation	depth m	elevation m	thickness m
Cretaceous	0	795	36
Portlandian	-36	759	359
Raur./Callov.	-395	400	279
Baj./Bath.	-674	121	226
Aalenian	-900	-105	102
Lw Aal. / Lias.	-1002	-207	333
Rh./Keuper	-1335	-540	327
Lett./MK dolom.	-1662	-867	45
MK evap.	-1707	-912	111
Buntsandstein	-1818	-1023	92
Permian	-1910	-1115	46
Carboniferous	-1956	-1161	68
Basement	-2024	-1229	43
T.D.	-2067	-1272	

BRGM, Champagnole 1965a

13) Toillon PREPA, T.D. = 1573m

elevation	x	y
844m	492'100m	174'000m

top of ... Formation	depth m	elevation m	thickness m
Malm	0	844	180
Argovian	-180	664	240
Dogger	-420	424	270
Aalenian	-690	154	225
Liassic	-915	-71	193
Keuper	-1108	-264	465
T.D.	-1573	-729	

BRGM, Champagnole 1965a

14) Valempoulières 1 PREPA, 1961 T.D. = 1421m

elevation	x	y
653m	481'400m	186'500m

top of ... Formation	depth m	elevation m	thickness m
Dogger	0	653	280
Aalenian / Lias.	-280	373	190
Keuper	-470	183	370
Lettenkhole	-840	-187	30
MK evap.	-870	-217	115
Keuper	-985	-332	120
MK evap.	-1105	-452	95
Buntsandstein	-1200	-547	72
Permian	-1272	-619	118
Basement	-1390	-737	31
T.D.	-1421	-768	

Bitterli 1972

15) Valempoulières 2 PREPA, 1962 T.D. = 1252m

elevation	x	y
643m	480'600m	186'000m

top of ... Formation	depth m	elevation m	thickness m
Rh./Keuper	-466	177	361
Lettenkohle	-827	-184	208
Middle Triassic	-1035	-392	182
Lower Triassic	-1217	-574	35
T.D.	-1252	-609	

Bitterli 1972

16) Thésy T.D. = 1108m
Cristalline rock

elevation	x	y
703m	484'200m	196'800m

17) Saugeot T.D. = 1307m

elevation	x	y
m	476'000m	162'000m

18) Salins-Les-Bains T.D. = 267m
Keuper

elevation
347m

19) Buez T.D. = 1200m

elevation	x	y
685m	522'400m	235'800m

top of ... Formation	depth m	elevation m	thickness m
Dogger	0	685	125
Aalenian/Lias.	-125	560	225
Rhaetian	-350	335	50
Dogger	-400	285	30
Aalenian/Lias.	-430	255	250
Keuper	-680	5	175
Lettenkohle	-855	-170	25
MK dolom.	-880	-195	25
MK evap.	-905	-220	200
Buntsandstein	-1105	-420	75
Basement	-1180	-495	20
T.D.	-1200	-515	

Bitterli 1972

Appendix 2 (pages 159-162): Legend on page 159.

Légende à la page 159.

20) Humilly 2 T.D. = 3040m

SNPA 1969

elevation		x	y
629m		480'500m	108'250m

top of ...

Formation	depth	elevation	thickness
	m	m	m
Tertiary	0	629	438
Cretaceous	-438	191	374
Malm	-812	-183	832
Argovian	-1644	-1015	211
Dogger	-1855	-1226	233
Aalenian	-2088	-1459	28
Liassic	-2116	-1487	410
Keuper	-2526	-1897	383
MK evap.	-2909	-2280	131
T.D.	-3040	-2411	

Persoz 1982, Wildi et al. 1991, Jenny et al. 1995

21) Buix T.D. = 1053m

elevation		x	y
395m		568'780m	258'620m

top of ...

Formation	depth	elevation	thickness
	m	m	m
Oxfordian	0	395	103
Dogger	-103	292	195
Aalenian	-298	97	158
Liassic	-456	-61	106
Keuper	-562	-167	186
Lett.	-748	-353	3
MK dolom.	-751	-356	20
MK evap.	-771	-376	221
Buntsandstein	-992	-597	51
Permian	-1043	-648	10
T.D.	-1053	-658	

Schmidt et al. 1924

Lithologies:

Raur. = Rauracian; Argov. = Argovian; Lias. = Liassic;
Bath. = Bathonian; Baj. = Bajocian
Lett. = Lettenkohle; MK = Muschelkalk;
MK dolom. = Muschelkalk dolomite;
MK evap. = Muschelkalk evaporites

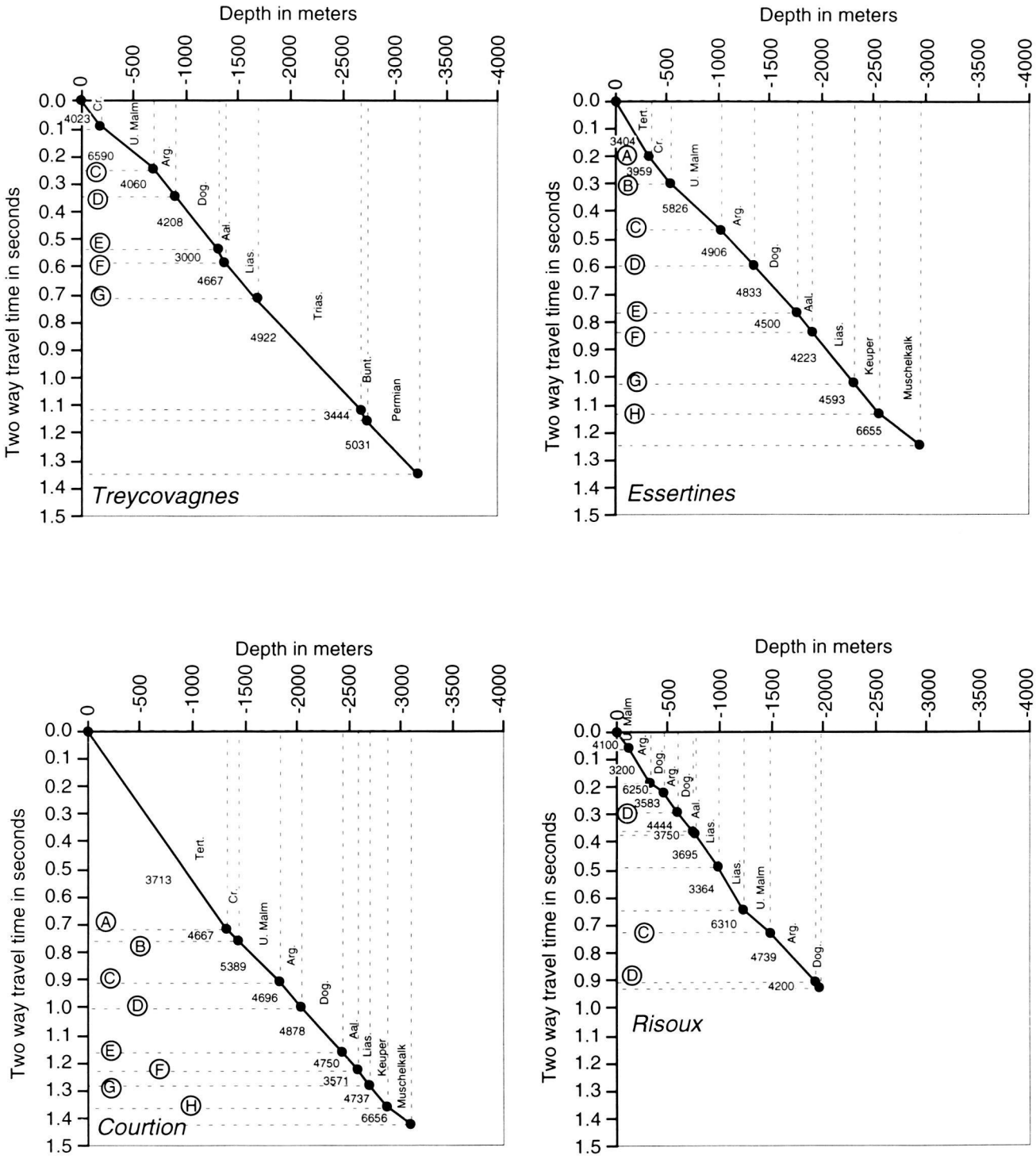
Companies:

PREPA = Société de Prospections, Recherches
et Etudes Pétrolifères en Alsace
SNPA = Société Nationale des Pétroles d'Aquitaine
SADH = Société anonyme des Hydrocarbures, Lausanne
KUS = Konsortium Untertagespeicher
RAP = Régie autonome des Pétroles

Appendix 2 (pages 159-162): Legend on page 159.

Légende à la page 159.

APPENDIX 3.1



Appendix 3.1: Seismic velocities deduced from correlation of seismic two way time interval (in seconds) and stratigraphic thicknesses (in meters) based on well log data.

Vitesses sismiques déduites de la corrélation entre les intervalles sismiques (en temps double, en secondes) et les épaisseurs stratigraphiques (en mètres) basées sur les données de forages.

APPENDIX 3.2

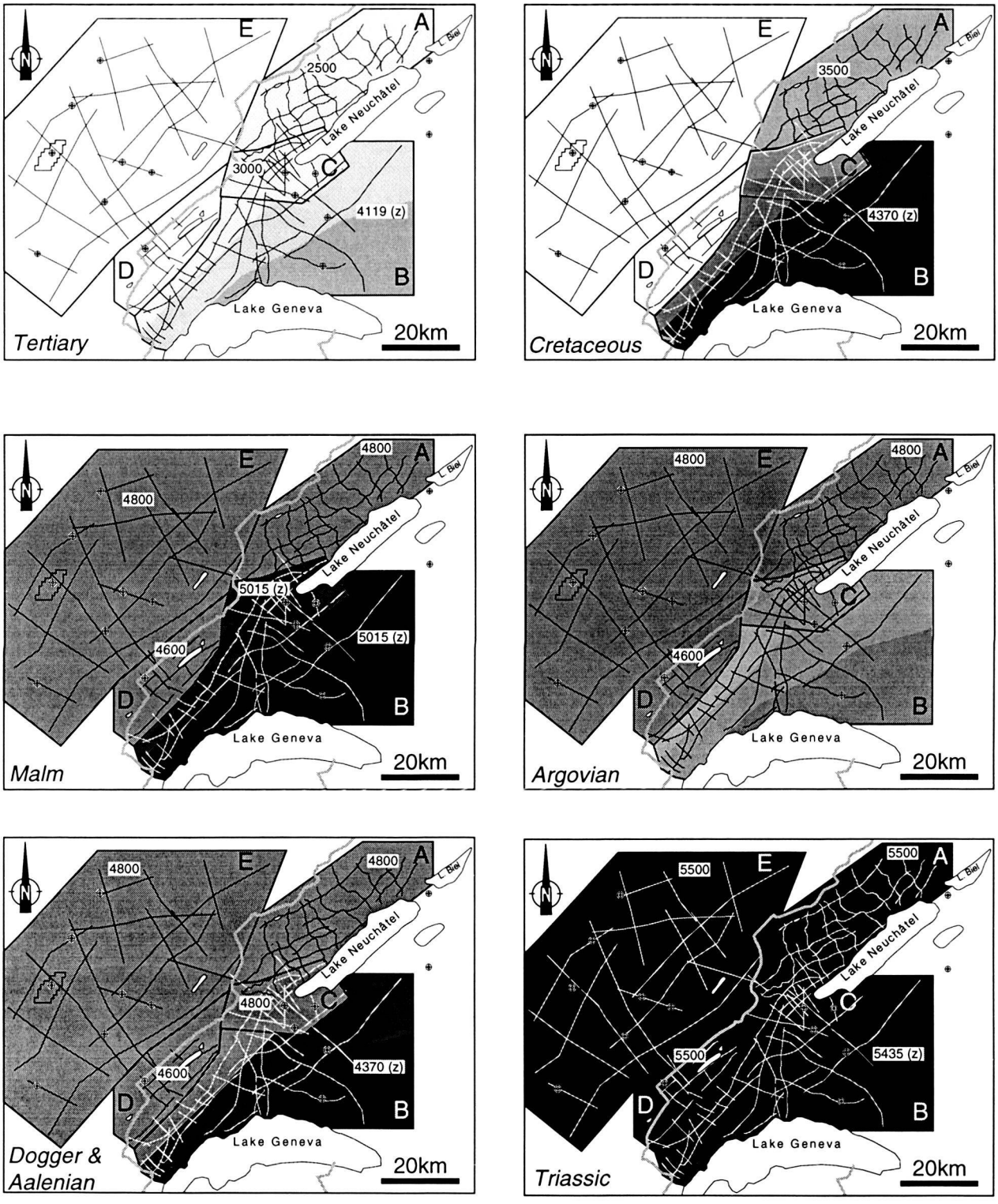
	A	B	B	C	C	D	E
	Neuchâtel Jura	Molasse Basin	interval	Treycovagnes area	interval	Risoux area	C.M. area
	BP	Shell/SADH	min-max veloc.	Shell/SADH	min-max veloc.	Shell	Shellrex
	1988	1973-1976		1973-1976		1973-1974	1970-1974
Formation	m/s	m/s	m/s	m/s	m/s	m/s	m/s
Tertiary	2500	4119* z^0.133	2500-4300	3000	3000	-	-
Cretaceous	3500	4370+0.477 z	4370-5700	4370+0.477 z	4370-5000	-	-
Malm	4800	5015+0.393 z	5015-6217	5015+0.393 z	5015-5500	4600	4800
Argovian	4800	1864* z^0.12	3240-5042	1864* z^0.12	3931-4500	4600	4800
Dog. & Aal.	4800	4370+z^0.477	4418-6276	4800	4800	4600	4800
Liassic	4800	995* z^0.17	2178-4107	995* z^0.17	3300-3800	4600	4800
Keuper	5500	5435+0.184z	5453-6224	5500	5500	5500	5000
MK evap.	5500	5435+0.184z	5453-6252	5500	5500	5500	5000

A, B, C, D, E: refers to velocity sector in Appendix 3.3
*: multiplication function
^: exponential function

Appendix 3.2: Table of seismic velocities used in this work. In the Jura area a simple velocity model attributing a constant velocity to each major interval (Tertiary, Cretaceous, Jurassic and Triassic) was used. In the Molasse Basin, however, more complex depth-dependent conversion functions from NAGRA (NAEF & DIEBOLD, 1990) were used in order to account for increased velocities due to the considerable thickening and facies changes of Tertiary sediments. See also Appendix 3.3.

Tableau des vitesses sismiques utilisées dans ce travail. Dans la région jurassienne, un modèle simple attribuant une vitesse constante à chaque intervalle majeur (Tertiaire, Crétacé, Jurassique et Trias) a été appliqué. Dans la région du Bassin molassique, on a utilisé un modèle plus complexe, nécessitant des fonctions qui tiennent compte de la profondeur des couches (NAEF & DIEBOLD, 1990, CEDRA). Voir aussi Annexe 3.3.

APPENDIX 3.3



Appendix 3.3: Map showing the seismic velocities used for the depth conversion of the seismic lines.

Carte montrant les vitesses sismiques utilisées pour la conversion en profondeur (en mètres) des profils sismiques (en secondes).