

***Oil and Gas Exploration in East Africa:  
Past trends and future challenges***

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***P&R Geological Consultants Pty Ltd***

East Africa Conference,  
London, October 2012

- Introduction
- Exploration history
- Company and country activity
- Success at last
- Future challenges
- Concluding remarks



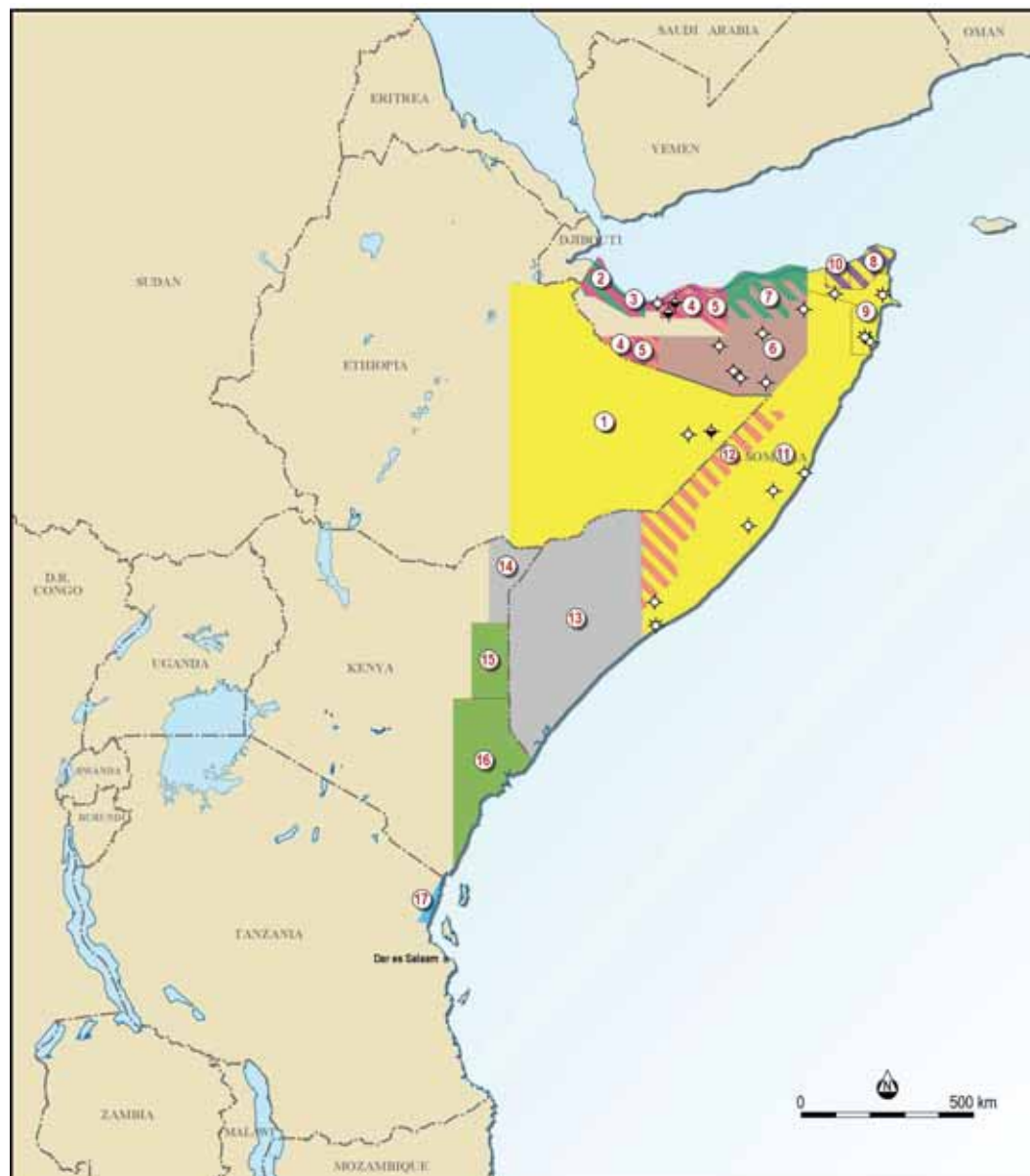
*Standard Vacuum's Dudley Expedition to Abyssinia, 1921*





# Exploration permits and wells, 1950s

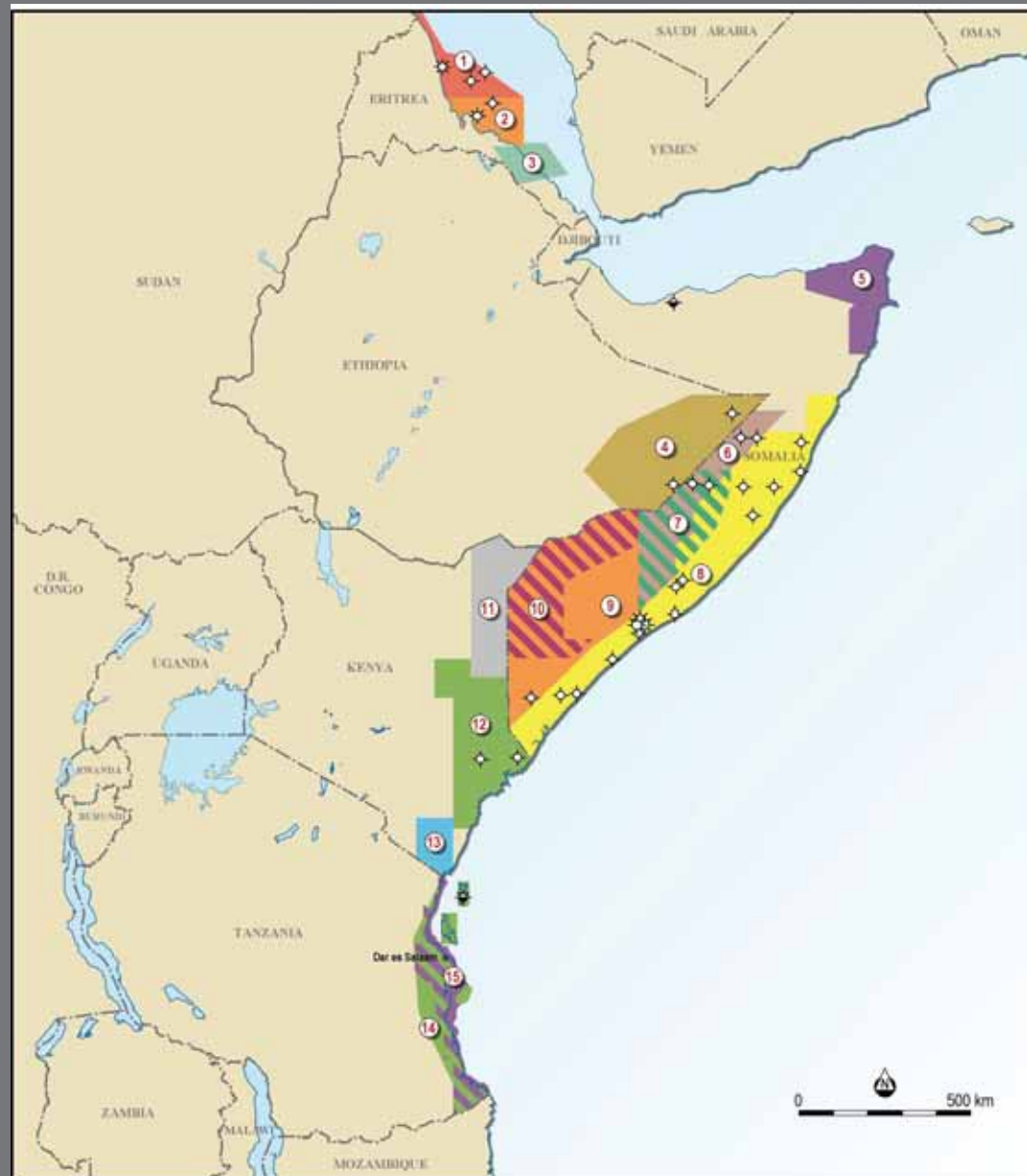
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Ethiopia	1	Sinclair	1951-7
Somaliland	2	Moriqui	1955-6
	3	BP	1956-60
	4	Moriqui	1953-5
	5	Standard Vacuum	1955-60
	6	Conorado	1952-8
	7	BP	1959-60
Somalia	8	AGIP	1953-63
	9	Sinclair	1952-7
	10	AGIP	1959-63
	11	Sinclair	1952-68
	12	St Vacuum (Mobil)	1957-65
	13	Frobisher	1958-62
Kenya	14	Frobisher	1957-61
	15	BP/Shell	1959-68
	16	Darcy(BP)/Shell	1954-72
Tanzania	17	Shell/Darcy(BP)	1951-72

# Exploration permits and wells, 1960s

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Ethiopia	1 Mobil	1963-70
	2 Gulf	1963-70
	3 Baruch Foster	1966-70
	4 Elwerath	1959-67
Somalia	5 AGIP	1953-63
	6 Mobil	1963-5
	7 Shebe Oil	1966-71
	8 Sinclair	1952-68
	9 Gulf	1962-5
	10 Hammar	1966-76
	11 Frobisher	1958-62
Kenya	12 BP/Shell	1960-72
	13 Mehta	1959-68
Tanzania	14 BP/Shell	1960-64
	15 AGIP	1969-70

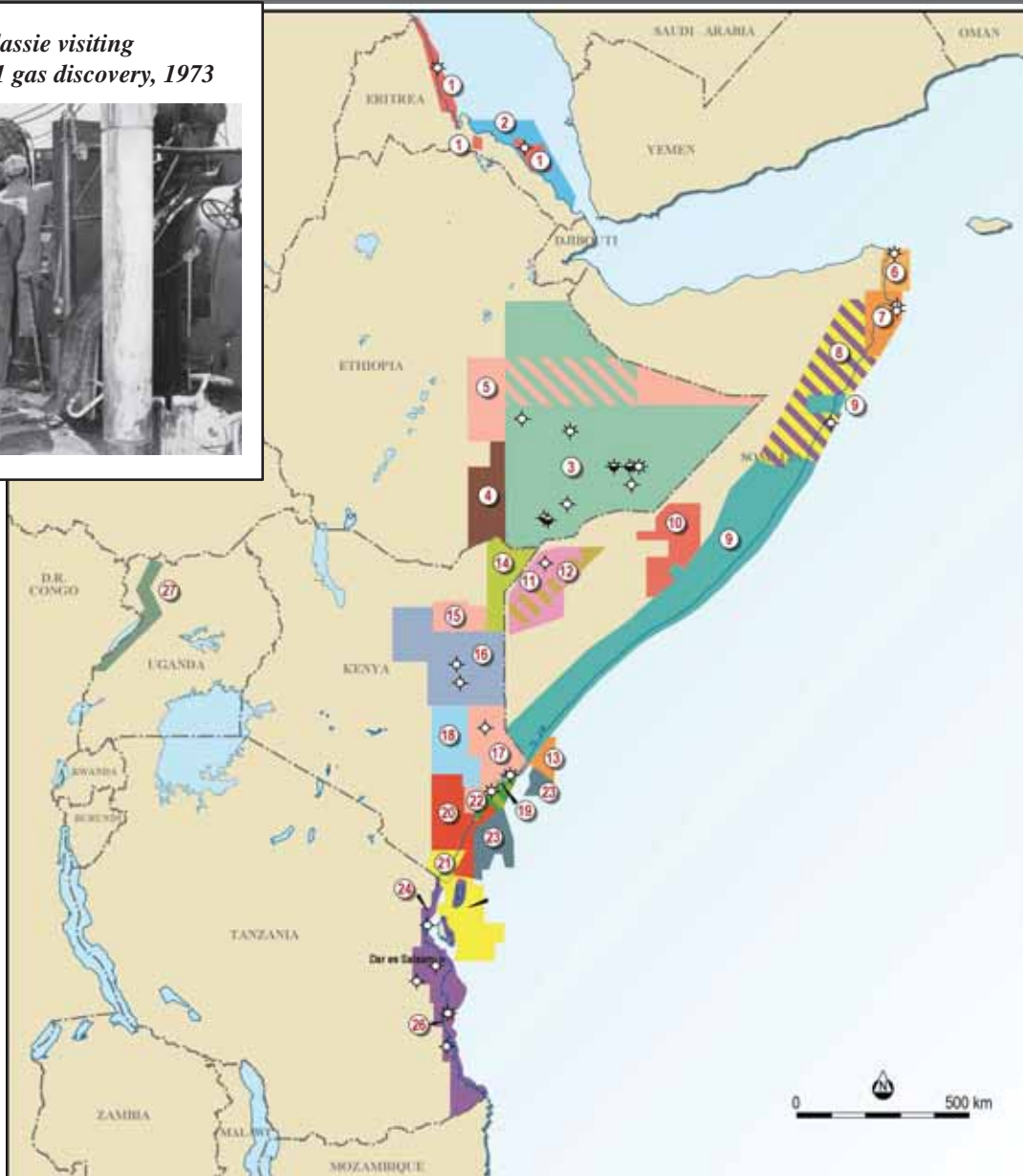


*Elwerath seismic crew,  
Ogaden Basin, c1964*

# Exploration permits and wells, 1970s

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Emperor Haile Selassie visiting  
Tenneco's Calub-1 gas discovery, 1973

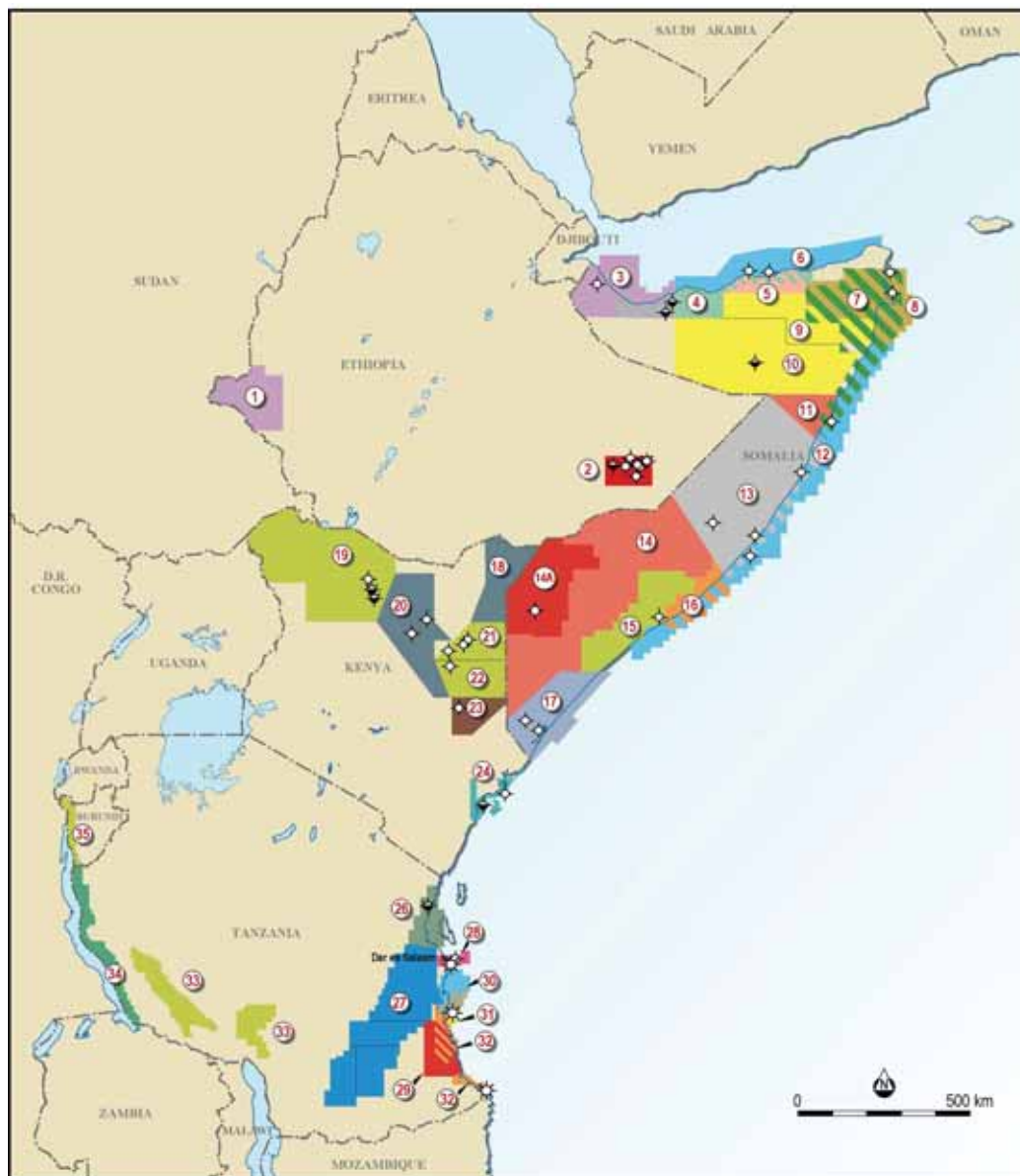


Ethiopia	1	Gen American	1968-79
	2	Shell	1974-7
	3	Tenneco	1969-76
	4	Voyager	1973-5
	5	Whitestone/LL&E	1973-7
Somalia	6	Elf	1971-8
	7	Elf/Exxon	1971-7
	8A	Conoco	1973-5
	8B	AGIP	1975-7
	9	Deutsche Texaco	1969-76
	10	Elf Shebel Group	1970-1
	11	Hammar	1970-6
	12	Burmah	1973-6
	13	Elf/Total	1973-8
	14	Adobe/Burmah	1970-6
Kenya	15	Whitestone	1973-6
	16	Chevron	1972-7
	17	Whitestone/TexPac	1973-7
	18	Canadian Superior	1972-7
	19	BP/Shell	1970-5
	20	Wainoco	1973-8
	21	Oceanic	1973-6
	21A	BP/Shell	1973-7
	22	Cities Service	1977-79
	23	Total	1972-79
	24	AGIP/AMOCO	1969-77
Tanzania	25	Oceanic	1975-8
	26	Tanzania Petroleum	1975
Uganda	27	Comoro	1971-4



# Exploration permits and wells, 1980s

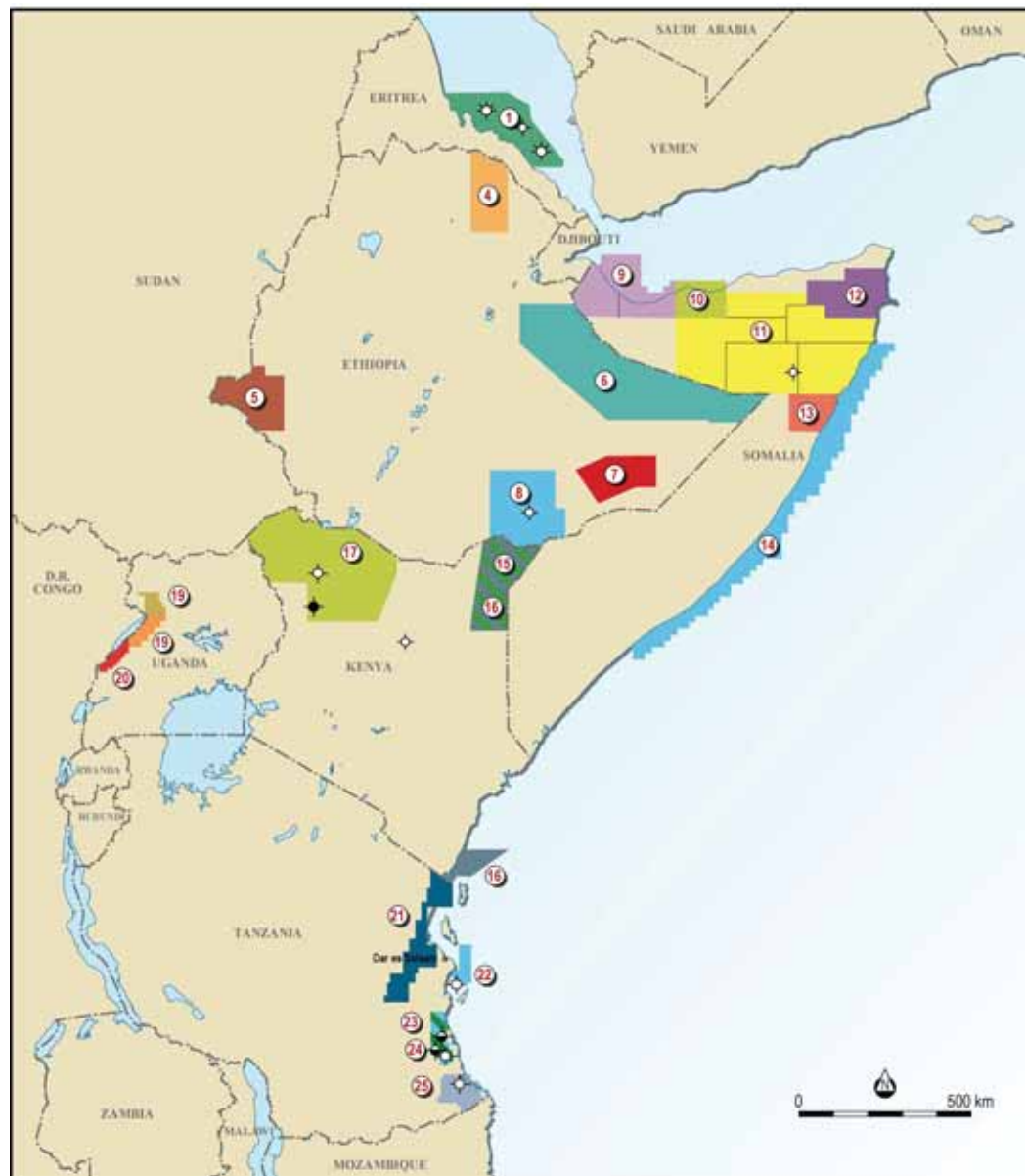
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Ethiopia	1	Chevron	1982-3
	2	SPEE	1981-9
Somalia	3	Chevron	1986-92*
	4	Quintana	1981-5
	5	Inpet	1986-7
	6	Shell	1981-7
	7	Cities Service	1981-6
	8	Oxy/AGIP	1986-8
	9	Conoco	1989-92*
	10	Conoco	1987-92*
	11	Phillips	1989-92*
	12	Shell	1988-92*
	13	ARCO	1979-84
	14	Esso/Shell	1984-7
	16	Esso	1987-9
	15	Amoco	1987-92*
Kenya	17	ELF	1984-6
	17	D. Texaco	1979-84
	18	Total	1989-92
	19	Amoco	1984-94
	20	Total/Marathon	1986-9
	21	Amoco/Petrofina	1989-9
	22	Amoco	1986-9
Tanzania	23	Petrocanada/NOC	1984-90
	24	Union/Cities/Oxy	1979-86
	25	IEDC	1981-6
	26	Shell/Esso/IEDC	1981-6
	27	Tanzania Petroleum	1975-82
Burundi	28	Shell/Esso	1986-90
	29	Shell	1988-90
	30	Songo	
	31	Agip/Amoco	1980-7
	32	Amoco	1985-8
Mozambique	33	Final/Amoco	1986-9
	34		
Zambia	35		
	35	Amoco	1984-9

# Exploration permits and wells, 1990s

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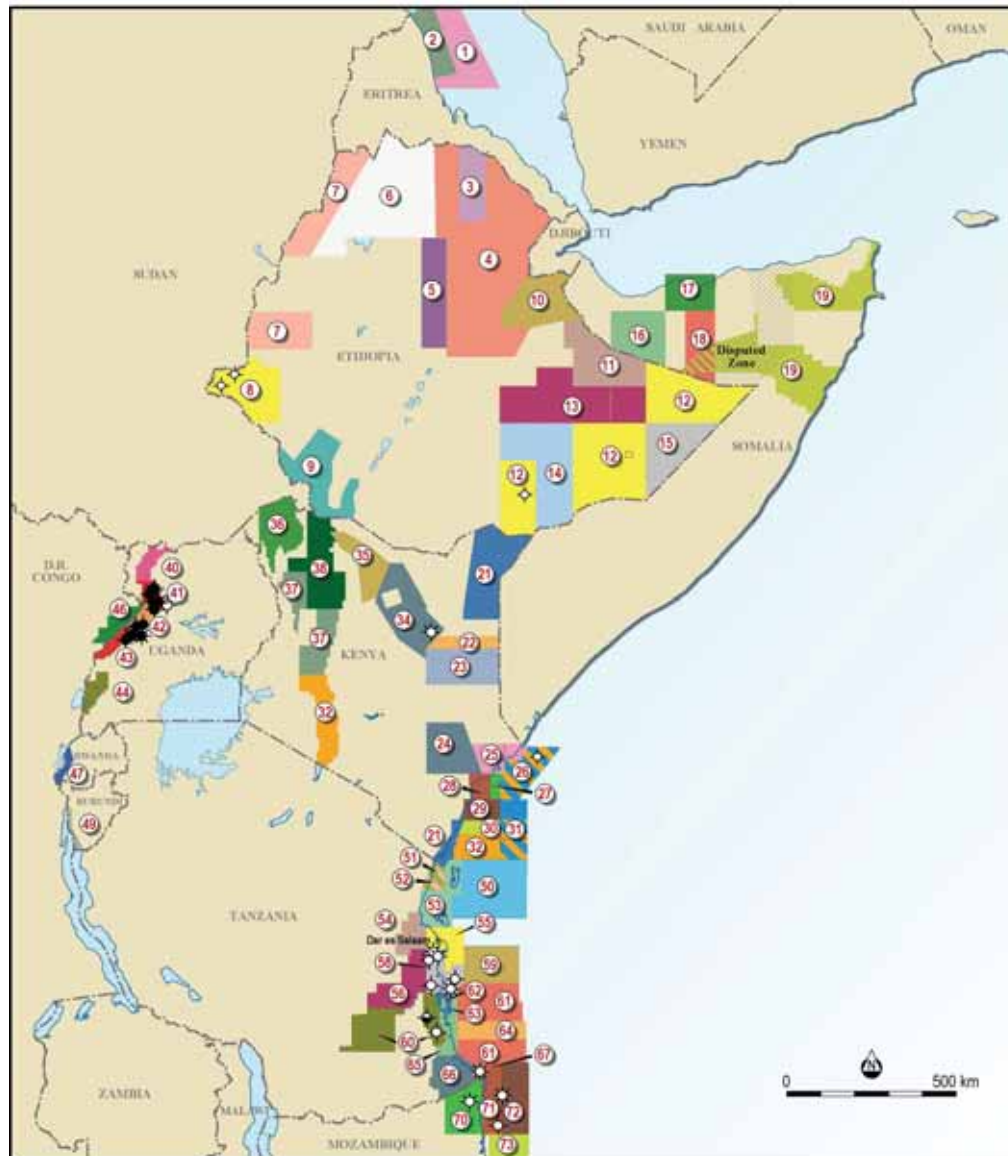


Eritrea	1	BP/IFP	1989-92
	2	Amoco	1989-93
	3	Anadarko	1995-9
Ethiopia	4	Afar Exploration	1994-5
	5	IPC	1991-6
	6	Maxus	1990-3
	7	Government block	1980-92
	8	Hunt	1990-5
Somalia	9	Chevron*	1986-92*
	10	Amoco*	1987-92*
	11	Conoco*	1987-92*
	12	AGIP*	1981-7*
	13	Phillips*	1989-92*
	14	Shell*	1988-92*
Kenya	15	Total	1989-92
	16	Tornado	1997-2000
	17	Amoco	1981-90
Uganda	18	Fina	1991-3
	19	Hardman	1987
	20	Heritage	1997-2003
Tanzania	21	Gulf Western	1998-02
	22	Shell	1986-91
	23	Shell	1988-92
	24	Dublin International	1996-02
	25	Texaco	1990-1

\* Permits in force majure after 1991 coup destabilized Somalia. Never re-instated.

# Exploration permits and wells, 2000s

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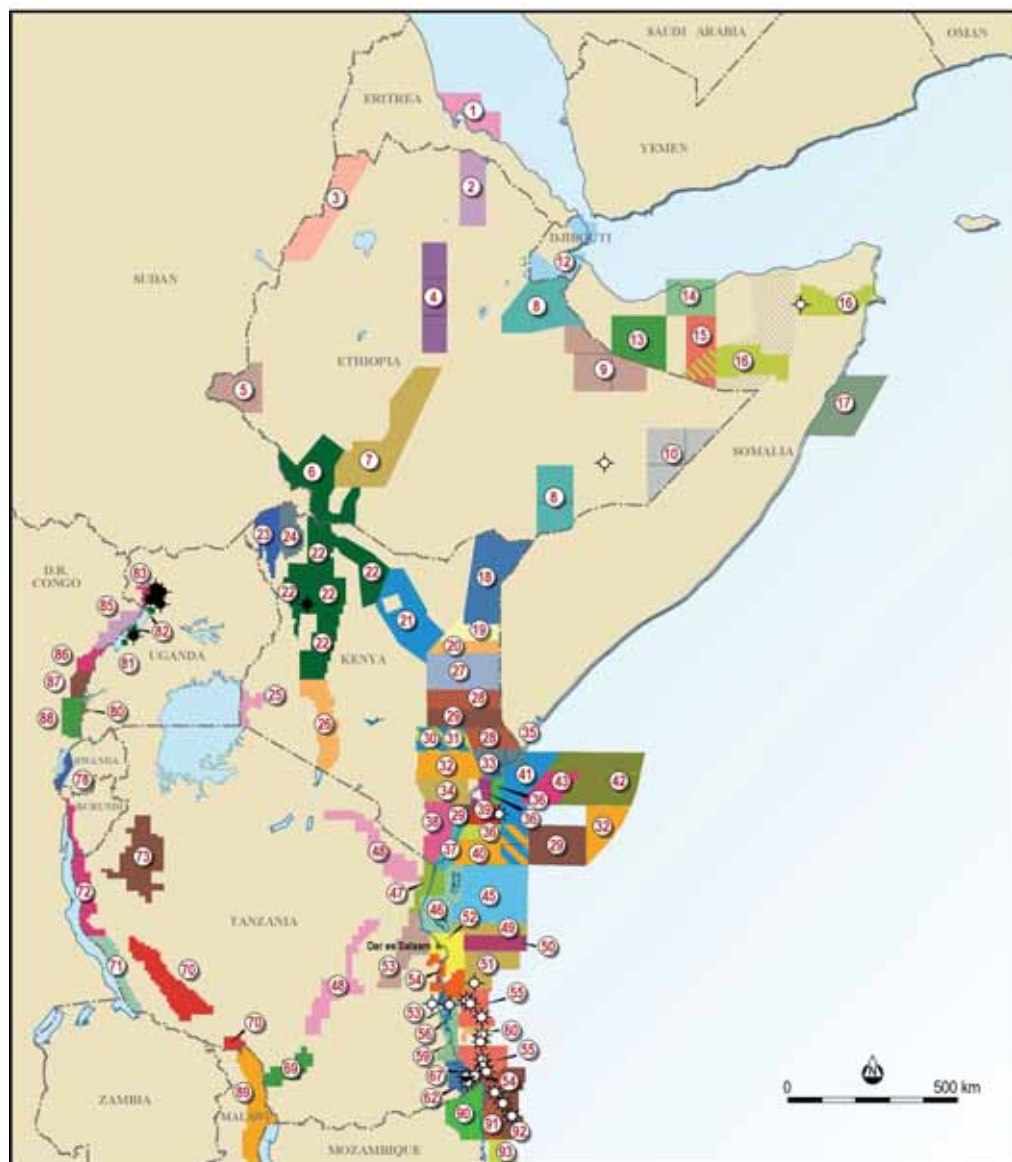


Eritrea	1	Defba	2009-10	Tanzania	50	Shell	2003-5
Ethiopia	2	Perenco	2001-6		51	Jebco	2006-
	3	Afar Exploration	2006-		52	Petrodel/Afren	2007-
	4	Transglobal	2008-		53	Antrim	2007-
	5	Falcon/Victoria	2008-		54	Dodsal/Mitras	2006-
	6	Epsilon	2009-		55	Petrodel	2007-
	7	Calvalley	2008-		56	Dominion	2005-10
	8	Petronas	2003-9		57	Heritage	2004-
	9	White Nile	2007-		58	Maurel and Prom	2004/6-
	10	Lundin/Africa Oil	2007-		59	Petrobras	2005/6-
	11	Southwest	2006-		60	Dominion	2005/6-11
	12	Petronas	2005-		61	BG/Ophir	2001-
	13	Titan	2008-		62	Pan African Energy	2005-11
	14	Lundin/Africa	2006-		63	Ndovu	2007-
	15	Pexco	2005-		64	Statoil	2006-
Somaliand	16	Ophir	2004-		65	Ophir	2002/5-
	17	Jacka Resources	2007-		66	Ndovu	2008-
	18	Assante	2008-		67	Hydrotanz	
Somalia	19	Range/Africa Oil	2006-	Mozambique	68	Artumas	
Kenya	20	East Africa Expl.	2008-		69	Anadarko	
	21	Lion	2007-		70	ENI	
	22	Vangold	2006/7-		71	Hydro	
	23	CNOOC	2008-				
	24	Sohi Gas	2000-8				
	25	Dana/Woodside	2009-				
	26	Flow	2002-				
	27	Woodside/Flow	2002-				
	28	Woodside/Origin	2007-				
	29	Origin/PCL	2006-				
	30	Anadarko	2007-				
	31	Dana	2007-				
	32	CNOC	2008-				
	33	Africa Oil	2007-10				
	34	CAMEC	2008-				
	35	Platform	2008-				
	36	Tullow/Turkana	2005-12				
Uganda	37	Tower/Global	2004-12				
	38	Tullow/Heritage	2001-12				
	39	Tullow/Heritage	2004-12				
	40	Tullow/Heritage	2004-10				
	41	Dominion	2006-9				
Congo	42	Tullow	2007-				
Rwanda	43	Vanoil	2008/9-				
Burundi	44	Surestream	2003-				



# Exploration permits and wells, 2010s

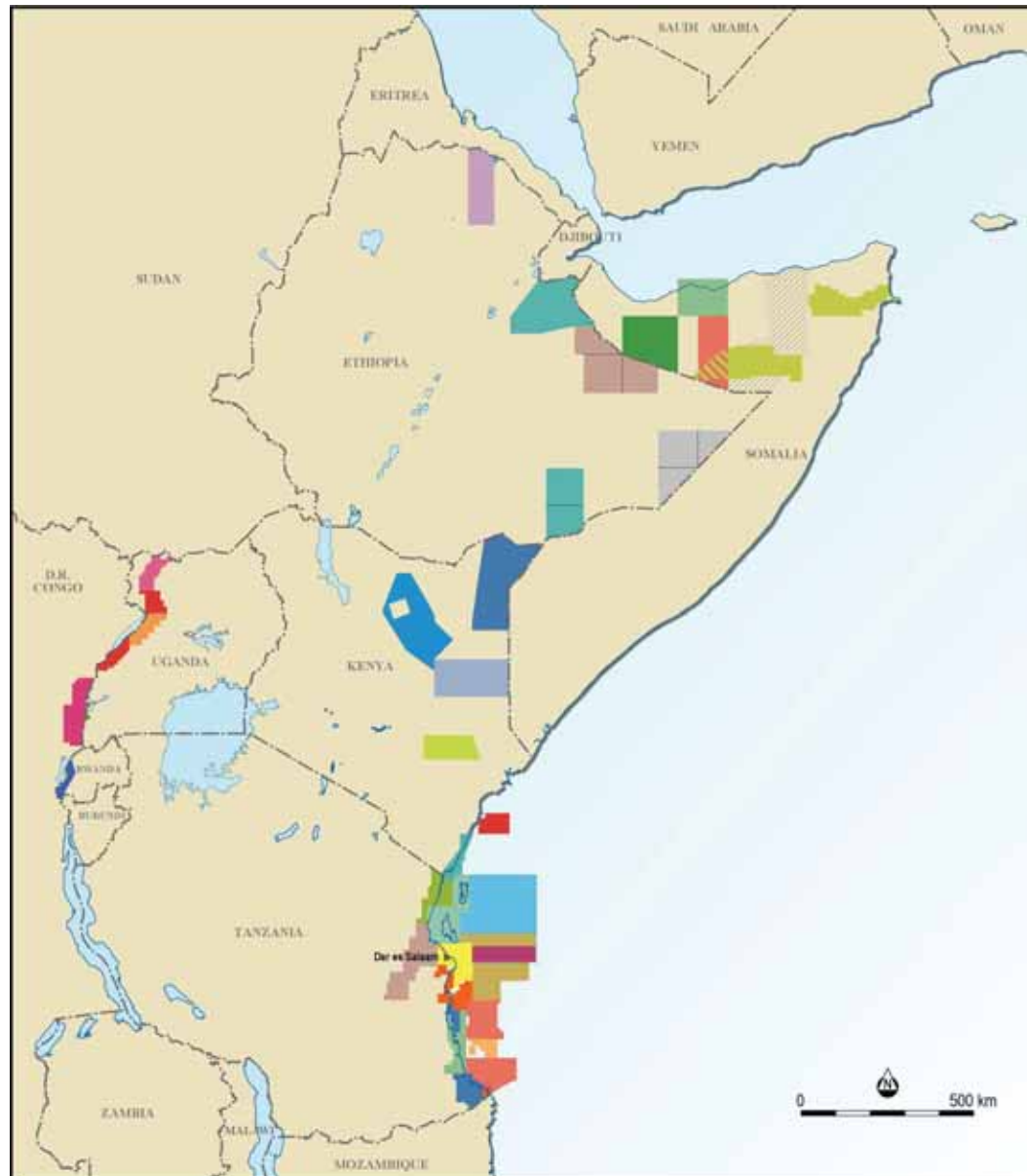
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Eritrea	1	Centric	2009-11	Tanzania	45	Shell	2003-
Ethiopia	2	Afar Exploration	2006-		46	Antrim	2007-
	3	Calvalley	2008-		47	Petrodel/Afren	2006-
	4	Falcon	2008-		48	Swala	2012-
	5	Southwest Energy	20011-		49	Petrobras	2004/6-
	6	Tullow	2008		50	Dominion	2007-
	7	Africa Oil	2011-		51	Petrobras	2012-
	8	Lundin/Africa Oil	2006/7		52	Petrodel	2006-
	9	Southwest Energy	2006-		53	Dodsai	2007-
	10	Pexco	2005-		54	Maurel and Prom	2004-
Djibouti	11	Oyster	2012-		55	BG/Ophir	2005/6-
	12	Jacka Resources	2007-		56	Ndovu	2005-11
Somaliland	13	Ophir	2004-		57	Pan African Energy	2001-
	14	Assante	2008-		58	Ndovu	2011-
Somalia	15	Africa Oil/Range	2007-		59	Ophir	2006-
	16	Range Resources	2012-		60	Statoil	2007-
Kenya	17	East Africa Expl.	2007/8-		61	Ndovu	2002/5-
	18	Simba	2011-		62	Hydrotanz	2008-
	19	Lion	2008-		63	Jacka	4/07/05
	20	Africa Oil	2006-		64	Heritage	2011/12-
	21	Tullow/Africa Oil	2008-		65	Beach	2010-
	22	EHRC	2012-		66	Total	2011-
	23	Adamantine	2012-		67	Motherland	2012-
	24	Swala	2012-	Burundi	68	Surestream	2008/9-
	25	NOCK	2010-		69	Minergy	2011-
	26	Vanoil	2007-		70	A-Z Petroleum	2012
	27	A-Z Petroleum	2012-	Rwanda	71	Vanoil	2007-
	28	Camac	2012-	Uganda	72	Dominion	2007-
	29	CNOC	10/07/06		73	CNOC	2012-
	30	Imara	2012-		74	Tullow	2012-
	31	Edgo Energy	2012-		75	Total	2012-
	32	Zarara	2008-	Congo	76	Oil DRC	2010-
	33	Pacific Seaboard	2012-		77	Total	2012-
	34	Flow Energy/PCL	2002-		78	Camac	2012-
	35	Dominion	2011/2-		79	Soho	2012-
	36	Dana	2000-5	Malawi	80	Surestream	2011-
	37	Rift Energy	2012-	Mozambique	81	Artumas	
	38	Apache/Origin	2002-		82	Anadarko	
	39	BG	2011-		83	ENI	
	40	Anadarko	2009-		84	Hydro	
	41	ENI	4/07/05				
	42	Total	4/07/05				

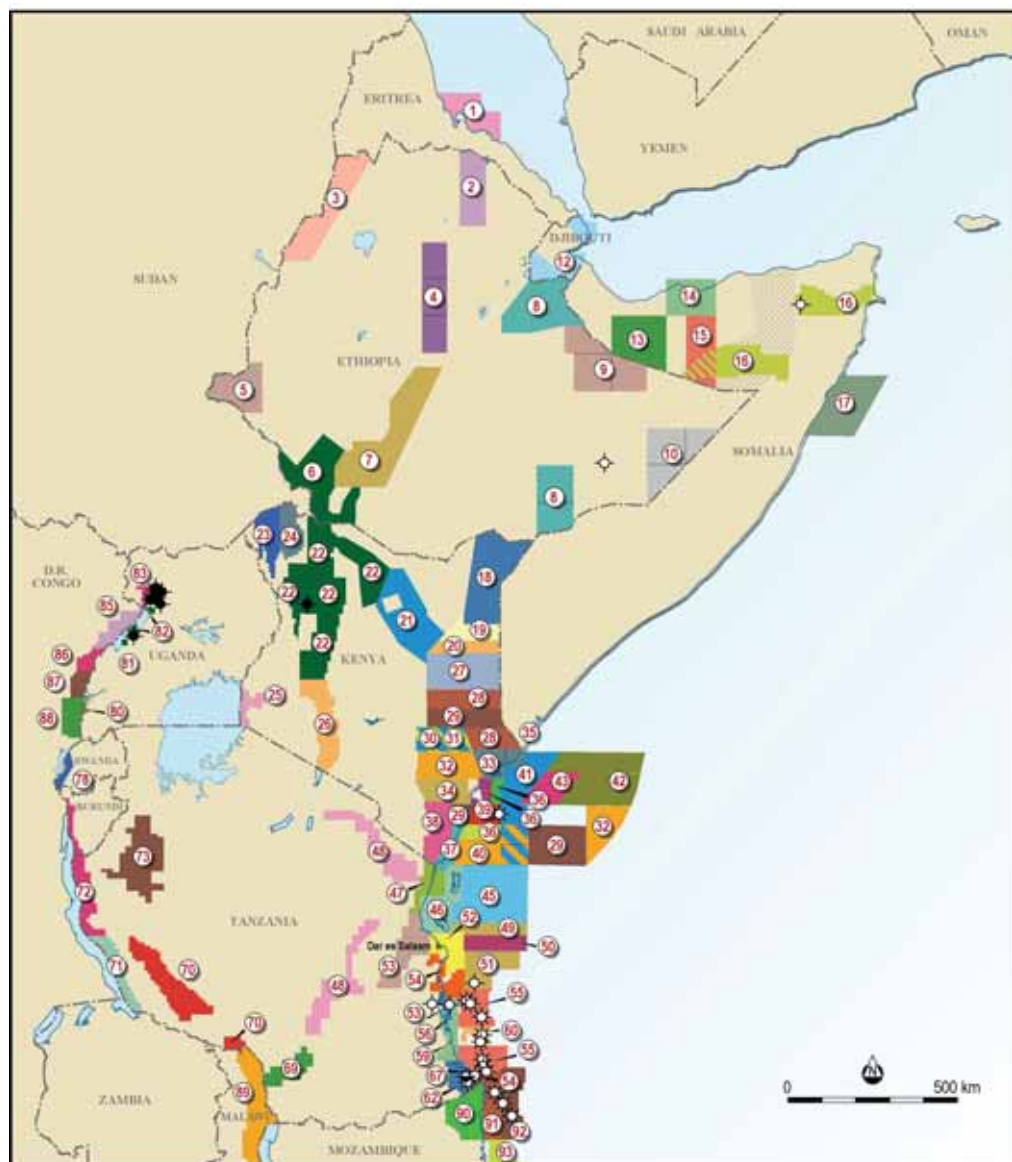
## Exploration permits and wells, 2007

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# Exploration permits and wells, 2010s

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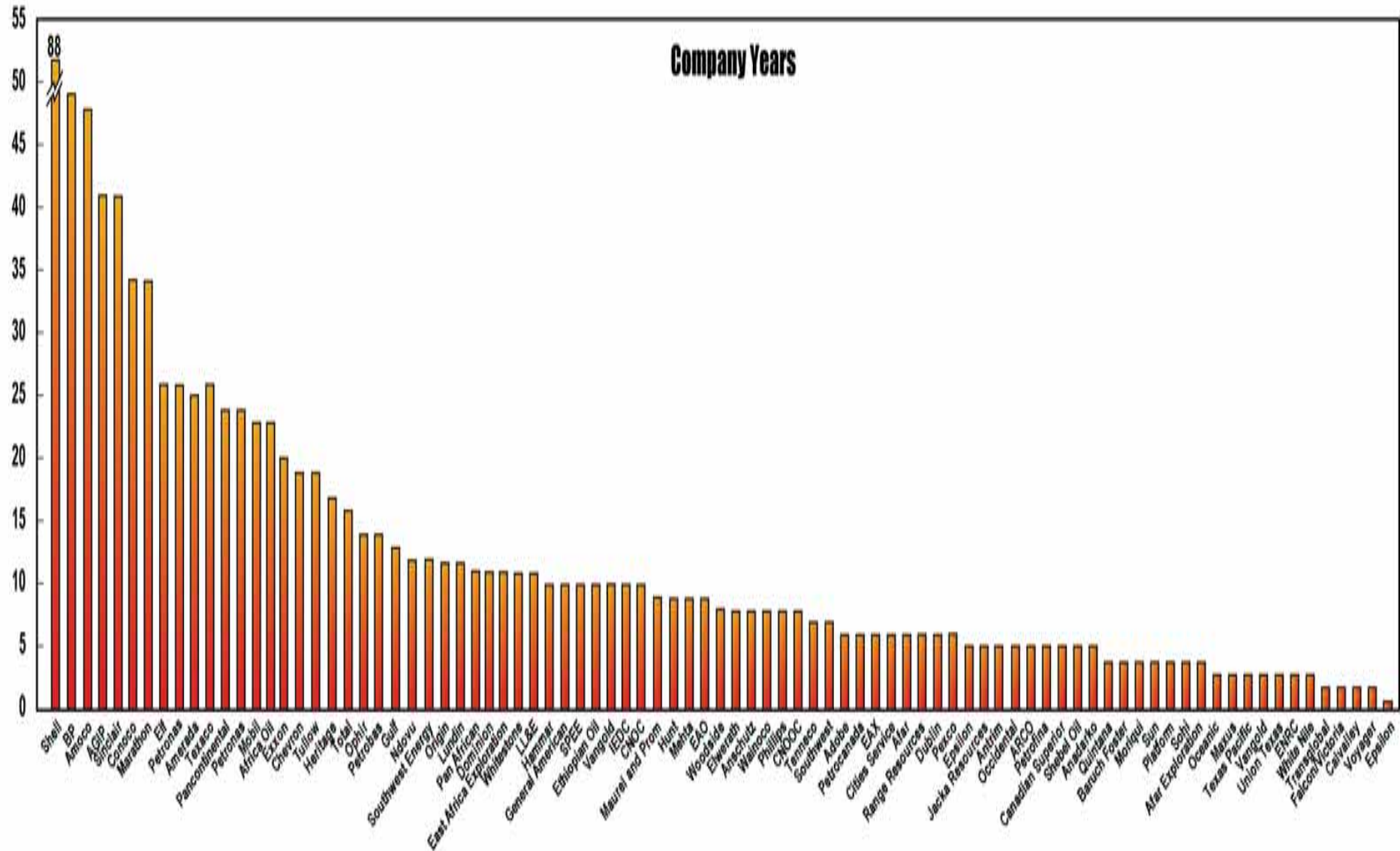


Eritrea	1	Centric	2009-11	Tanzania	45	Shell	2003-
Ethiopia	2	Afar Exploration	2006-		46	Antrim	2007-
	3	Calvalley	2008-		47	Petrodel/Afren	2006-
	4	Falcon	2008-		48	Swala	2012-
	5	Southwest Energy	20011-		49	Petrobras	2004/6-
	6	Tullow	2008		50	Dominion	2007-
	7	Africa Oil	2011-		51	Petrobras	2012-
	8	Lundin/Africa Oil	2006/7		52	Petrodel	2006-
	9	Southwest Energy	2006-		53	Dodsal	2007-
	10	Pexco	2005-		54	Maurel and Prom	2004-
Djibouti	11	Oyster	2012-		55	BG/Ophir	2005/6-
	12	Jacka Resources	2007-		56	Ndovu	2005-11
Somaliland	13	Ophir	2004-		57	Pan African Energy	2001-
	14	Assante	2008-		58	Ndovu	2011-
Somalia	15	Africa Oil/Range	2007-		59	Ophir	2006-
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	20	Africa Oil	2006-		64	Heritage	2011/12-
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	22	EHRC	2012-		66	Total	2011-
	23	Adamantine	2012-		67	Motherland	2012-
	24	Swala	2012-	Burundi	68	Surestream	2008/9-
	25	NOCK	2010-		69	Minergy	2011-
	26	Vanoil	2007-		70	A-Z Petroleum	2012
	27	A-Z Petroleum	2012-	Rwanda	71	Vanoil	2007-
	28	Camac	2012-	Uganda	72	Dominion	2007-
	29	CNOC	10/07/06		73	CNOC	2012-
	30	Imara	2012-		74	Tullow	2012-
	31	Edgo Energy	2012-		75	Total	2012-
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	37	Rift Energy	2012-	Mozambique	81	Artumas	
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	40	Anadarko	2009-		84	Hydro	
	41	ENI	4/07/05				
	42	Total	4/07/05				



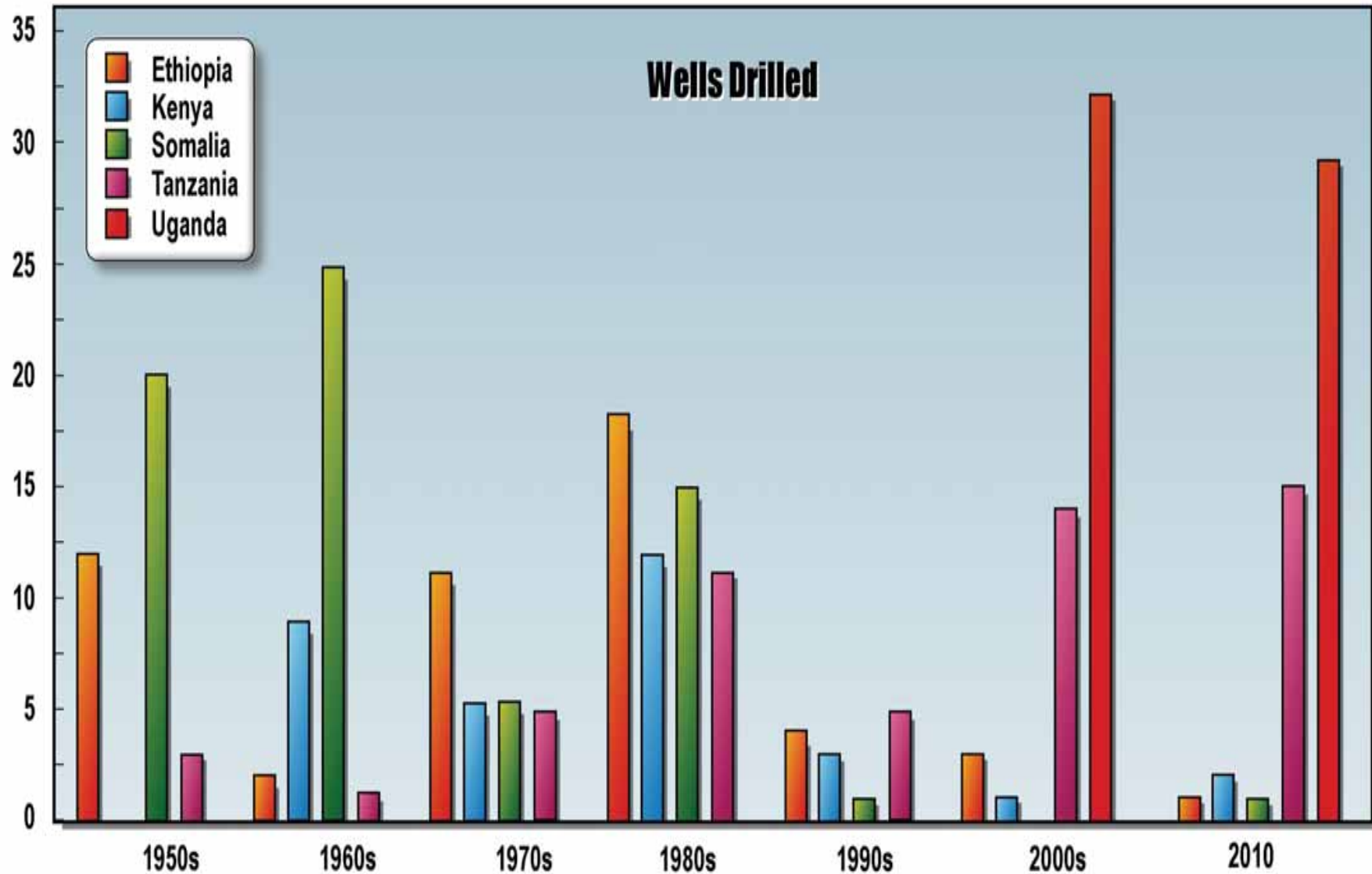
# Company exploration permit-years in East Africa 1950-2012

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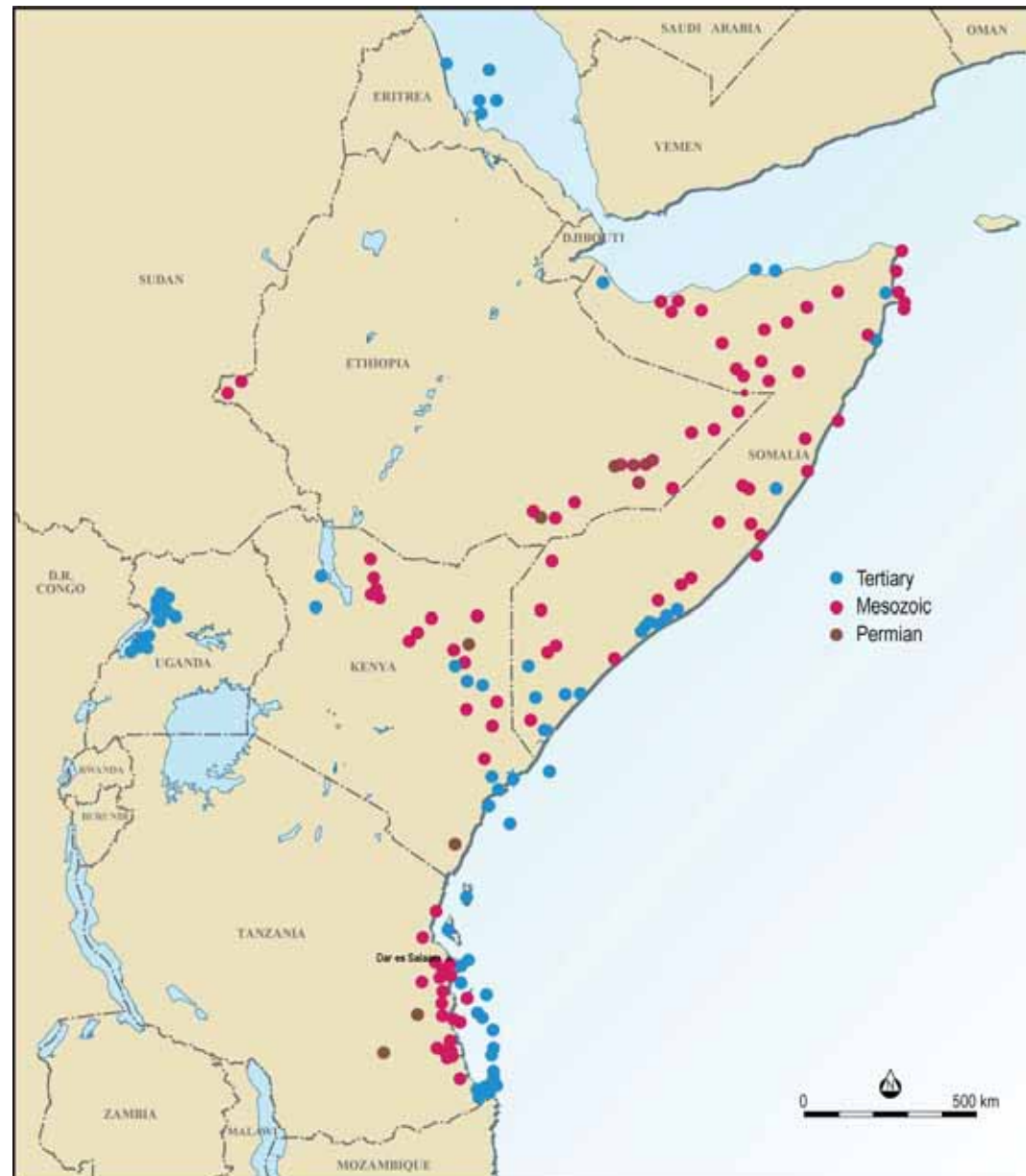
## Drilling activity in East Africa, 1950s -2010s

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## Age of main target sequences in East Africa wells

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# International border conflicts in East Africa

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Somaliland and Puntland  
conflict over Nogal Valley

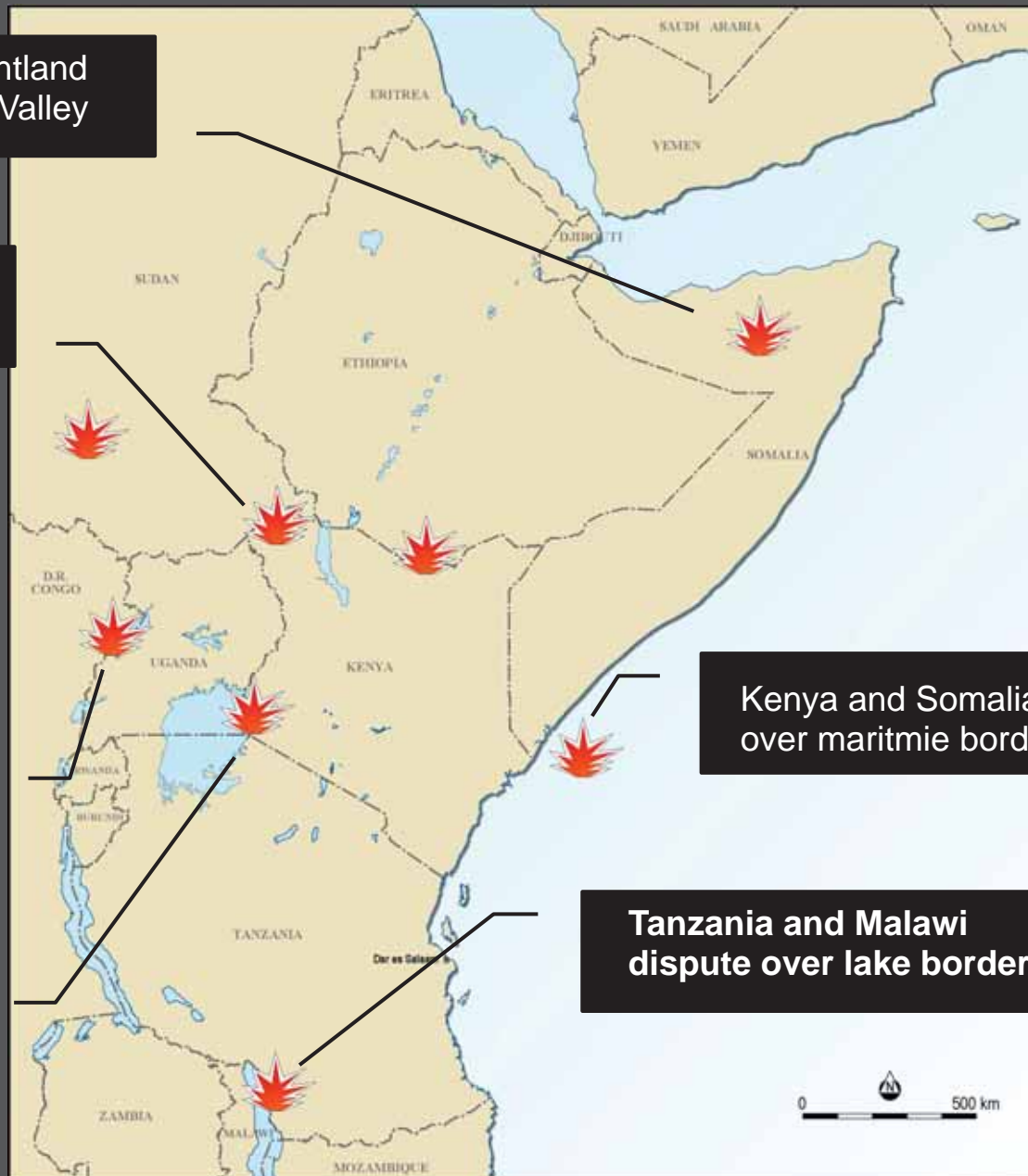
South Sudan and Kenya  
dispute over Ilemi Triangle

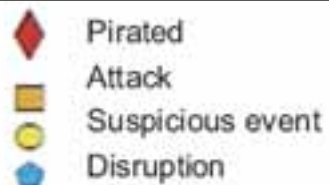
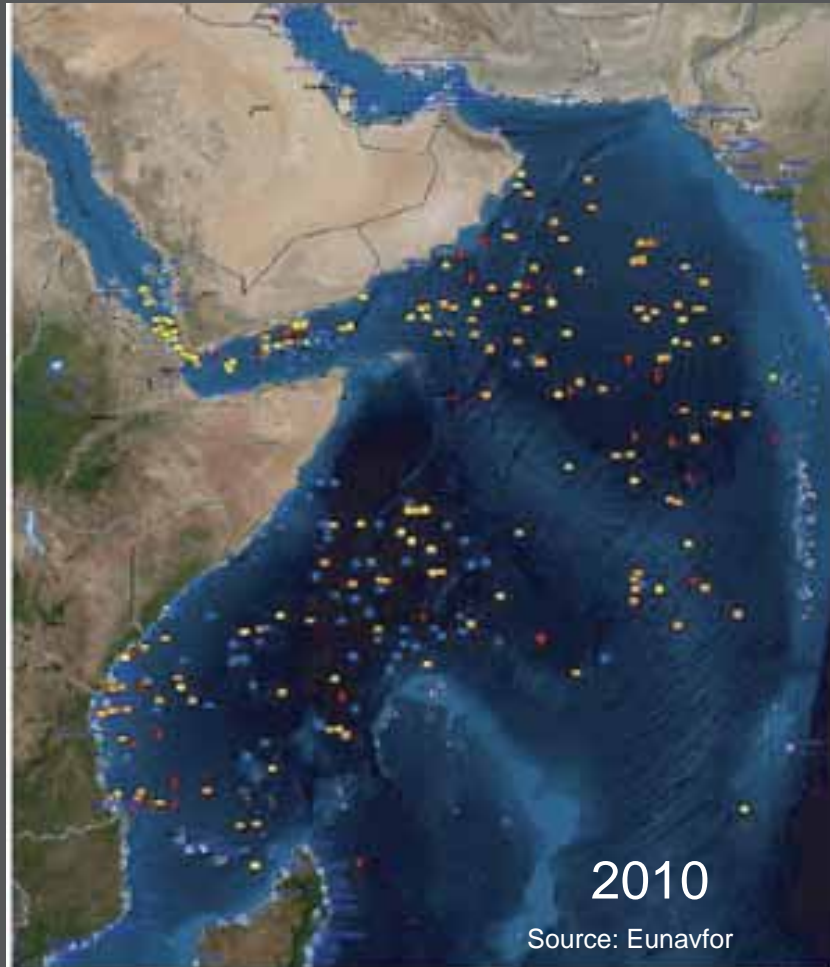
Uganda and DRC dispute  
over Lake Albert border

Kenya and Uganda dispute  
over Lake Victoria border

Kenya and Somalia dispute  
over maritime border

Tanzania and Malawi  
dispute over lake border





- Somali piracy virtually precludes any offshore exploration
- Multinational counter-piracy effort, including patrolling warships and security teams on vessels, is having an impact, with hijackings reduced by 40% in 2012
- Long term solution requires long-term solution onshore and that remains elusive



# Internal conflict areas in East Africa

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Anuah people in Gambela in dispute over land and oil

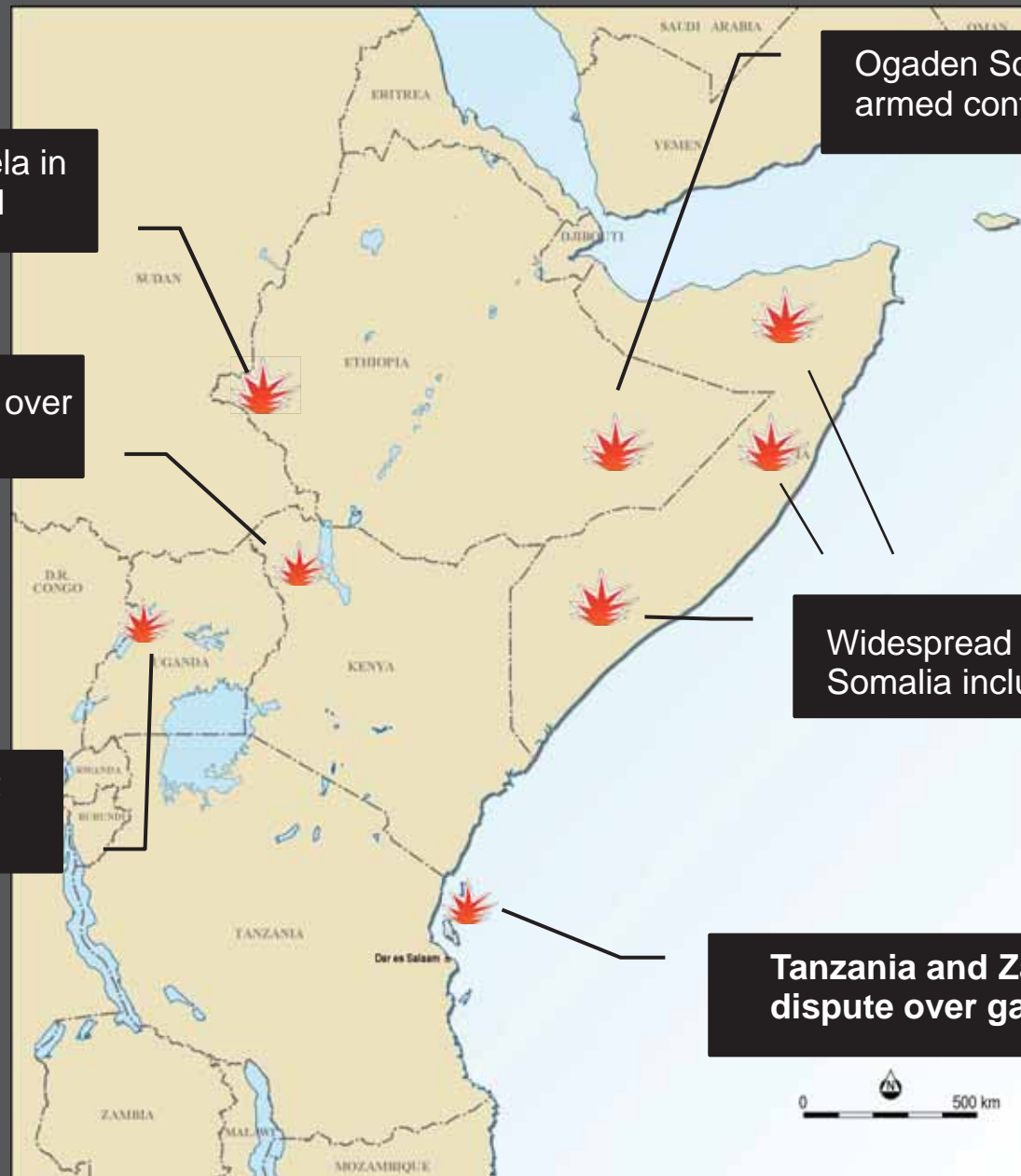
Unrest in Turkana region over share of oil benefits

Social unrest and conflict in Lake Albert region

Ogaden Somali clan in armed conflict with Ethiopia

Widespread conflict in Somalia includes oil rights

Tanzania and Zanzibar dispute over gas finds





- Widespread mythology in recent decades of hidden oil fields, now seen to be confirmed by recent discoveries, has created high expectations
- Modern communications and travel, even in remotest areas, means that the potential wealth from oil discoveries is well known and ardently sought.
- Rapidly emerging middle class in many countries is increasingly distrusting of Government
- Educated and relatively wealthy diaspora in North America and Europe are a major influence
- Widespread 'independence' aspirations, as communities seek local autonomy and control of natural resources
- Increased focus on communities and social justice by NGOs, with criticism of companies both in-country and at home

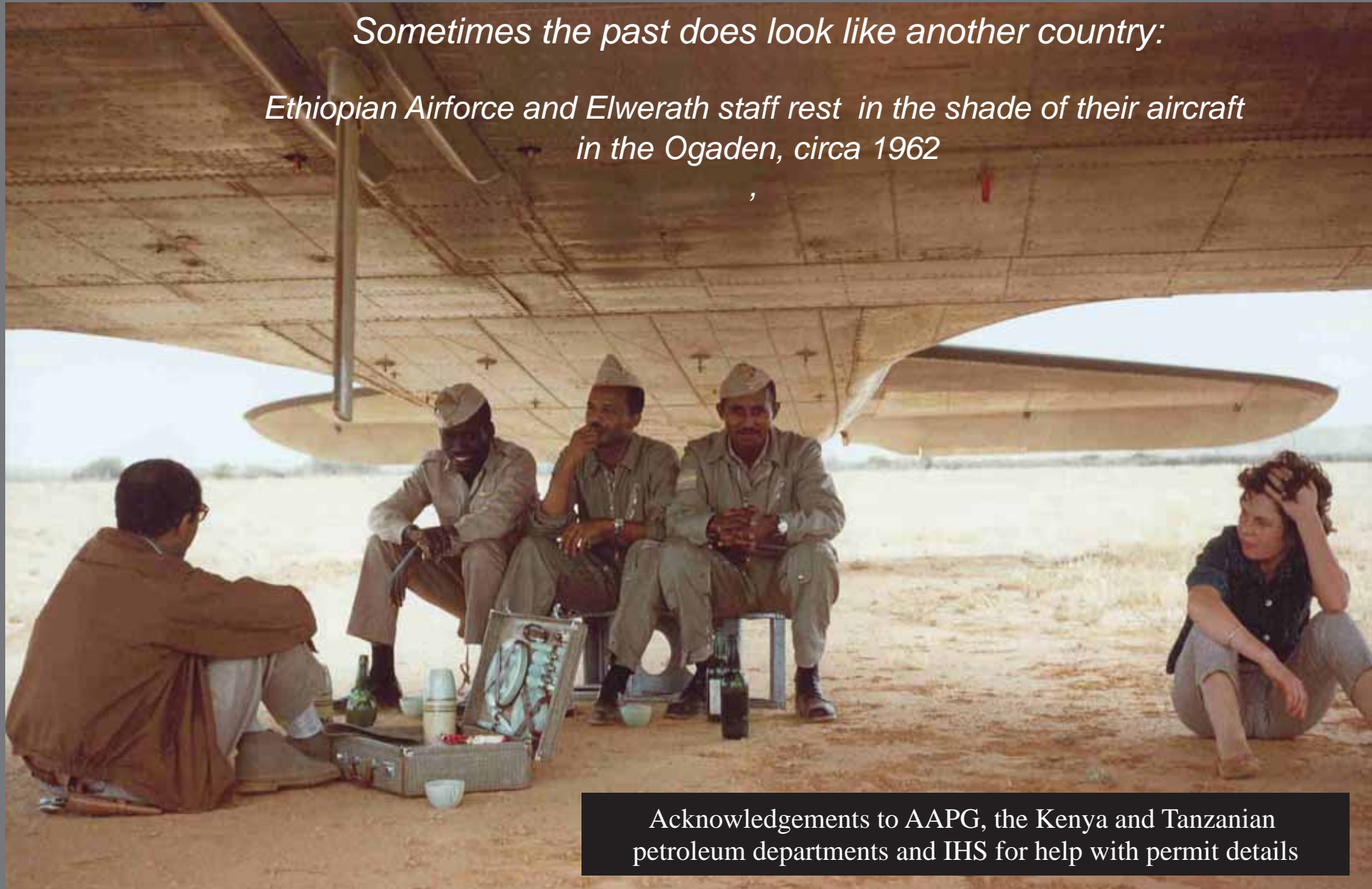
- The social contract between the diverse ethnic groups and Government is under considerable stress in many East African countries
- The wealth associated with major oil and gas discoveries adds greatly to that stress and increases the potential for social discord and violence
- Companies need to ensure their key personnel are well informed about the complexity and conflicts within the society
- This is not just for the Community Relations team; the exploration team is first on the ground and building a secure relationship with local communities begins with them.
- Transparency, consultation and communication are essential from the beginning
- Even with the best of intentions and efforts, it is a challenge
- But it is a challenge we have to meet to ensure the oil and gas we have found proves to be a blessing for East Africa , not a curse.

# Thank you

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*Sometimes the past does look like another country:*

*Ethiopian Airforce and Elwerath staff rest in the shade of their aircraft  
in the Ogaden, circa 1962*



Acknowledgements to AAPG, the Kenya and Tanzanian petroleum departments and IHS for help with permit details