Evaluation of Long Term Management Plans for Northern Hake

Gestión de Recursos Demersales:

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Objetive of the study

- Help answering some of the questions raised in the Non-Paper from the EC in relation to the LTMPNH
- Also, start assessing at the consequences of a request of advice to STECF from NWWRAC

Short overview…

- The recovery plan is foreseen to be replaced by a management plan… (ICES assessment carried out in 2007 indicates so…)

- In 2007 the EC asked the STECF to provide scientific advice regarding several possible scenarios to be considered in the future long-term management plan for Northern Hake.
- This was carried out during two STECF working groups held in June and December 2007 (STECF/SGBRE/07/03 and STECF/SGBRE/07/05).

Northern Hake Long Term Management Plans

- STECF meeting in Lisbon (June 2007): Biological evaluation of a proposed long term management plan for Northern Hake .
- This plan considered: reaching a Ftarget decreasing F annually by different percentages.
- Fmax = 0.17 was taken as a proxy for Fmsy.
- Three different Ftargets were tested, Fmax, 0.8Fmax and 1.2 Fmax.
- Three different levels of F variation were considered 5%, 10% and 15%.

EC – Non Paper (April-May 2008)

- The Commission circulated a non paper in which some questions about possible LTM plans for Northern Hake were raised.
- Ftarget = Fmax ; Fvar = 10% (minimum)
- Which fishing opportunities should be adjusted: TACs, fishing effort or both, 15% var in TAC, 10%??
- Improvement of selection pattern:
  - *Should the mesh size for the hake gillnet fishery be increased from 100mm to 120mm?*
  - *Should the mesh size of the demersal fishery less than 100mm be increased?*

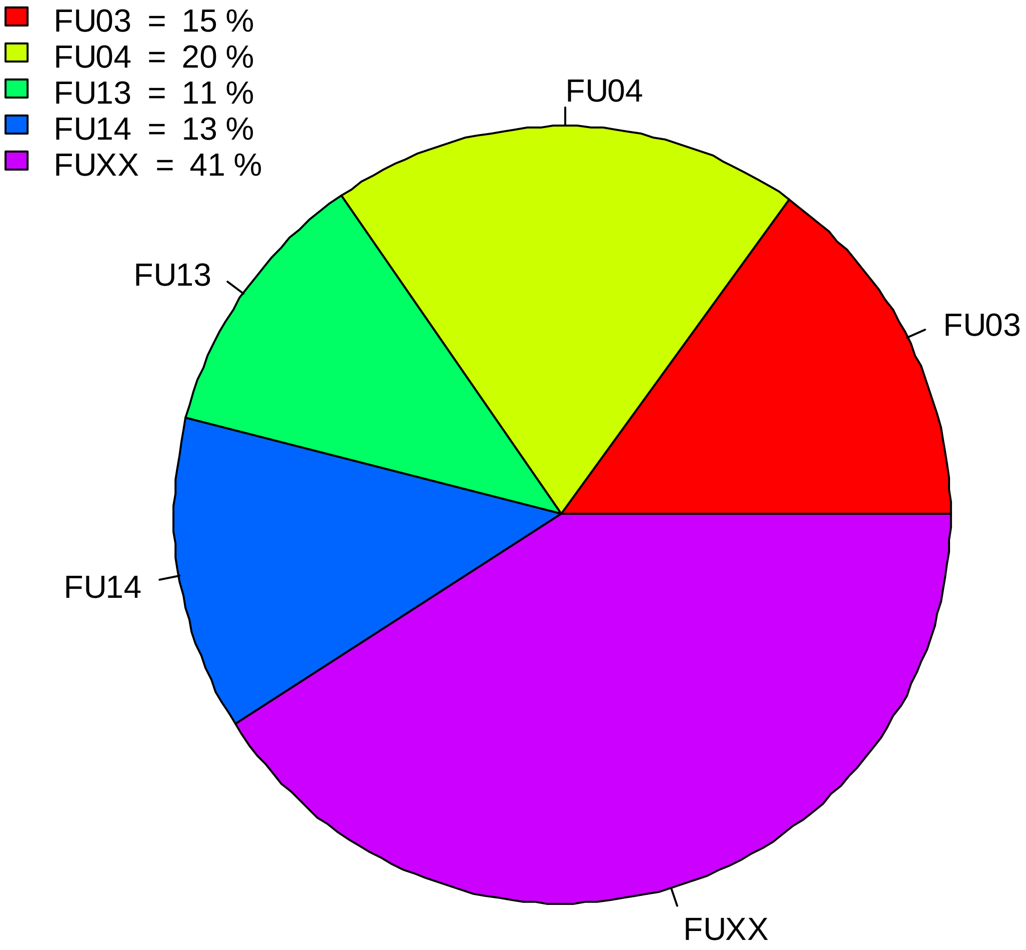
NWWRAC – Letter for advice from STECF (May 2008)

- What will be the probable increase in F induced by the harmonisation of the rules through a single 100mm mesh size for vessels targeting Northern Hake throughout the distribution area of the stock, be, given the current practices and the current fishing effort in Areas VI & VII?

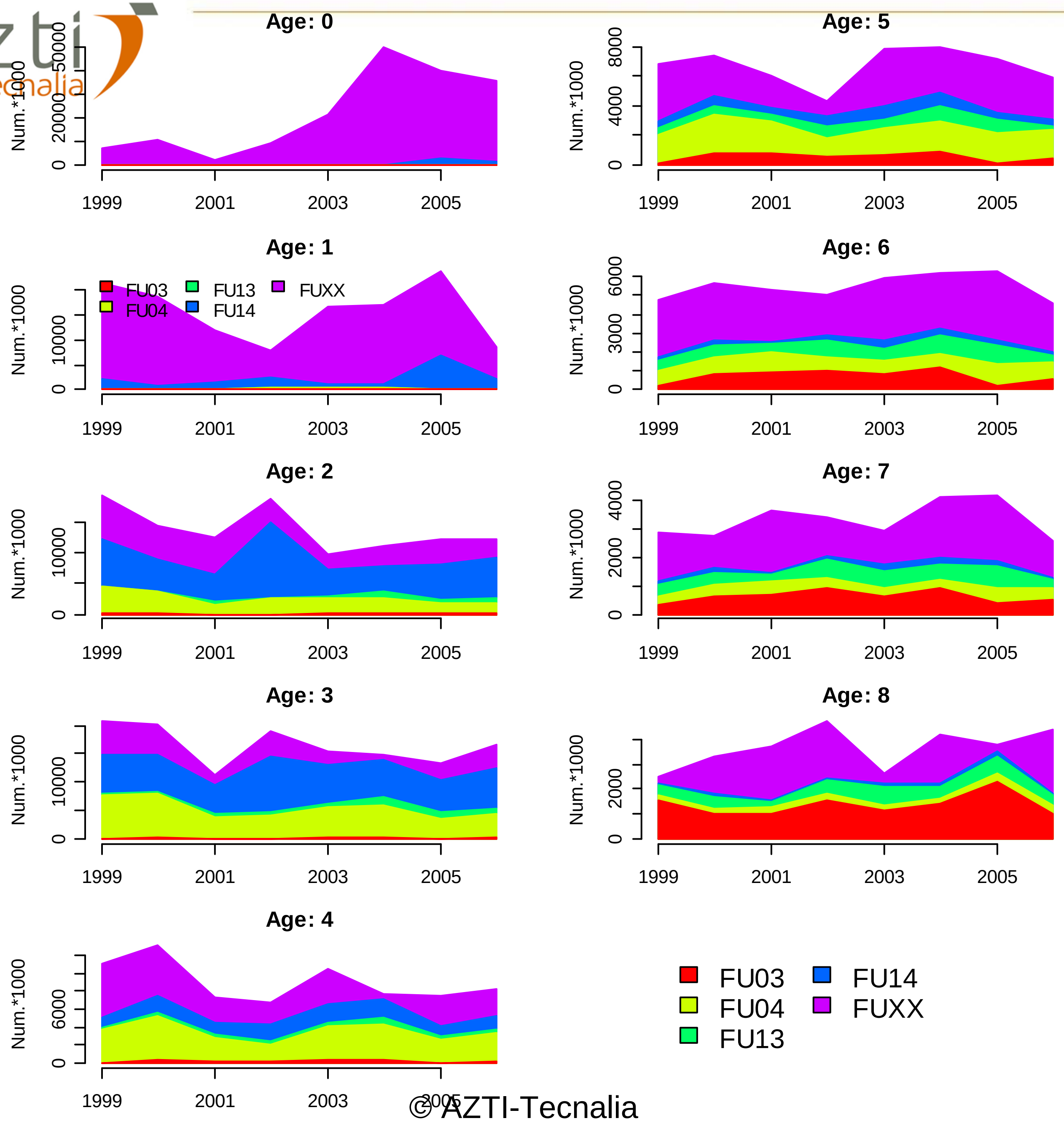
SCENARIOS

		Ftarget	Yearly F var	Yearly TAC var	Tech. Changes
Base Case	1	Fmax	10%	no limit	no
	2	Fmax	no limit	15%	no
	3	Fsq	no limit	15%	no
FU13	4	Fmax	10%	no limit	120mm FU13
	5	Fmax	no limit	15%	120mm FU13
	6	Fsq	no limit	15%	120mm FU13
FU14	7	Fmax	10%	no limit	130mm FU14
	8	Fmax	no limit	15%	130mm FU14
	9	Fsq	no limit	15%	130mm FU14
FU03	10	Fmax	10%	no limit	100 mm FU03
	11	Fmax	no limit	15%	100 mm FU03
	12	Fsq	no limit	15%	100 mm FU03
FU13 & FU14	13	Fmax	10%	no limit	120 FU13 and 130 FU14
	14	Fmax	no limit	15%	120 FU13 and 130 FU14
	15	Fsq	no limit	15%	120 FU13 and 130 FU14

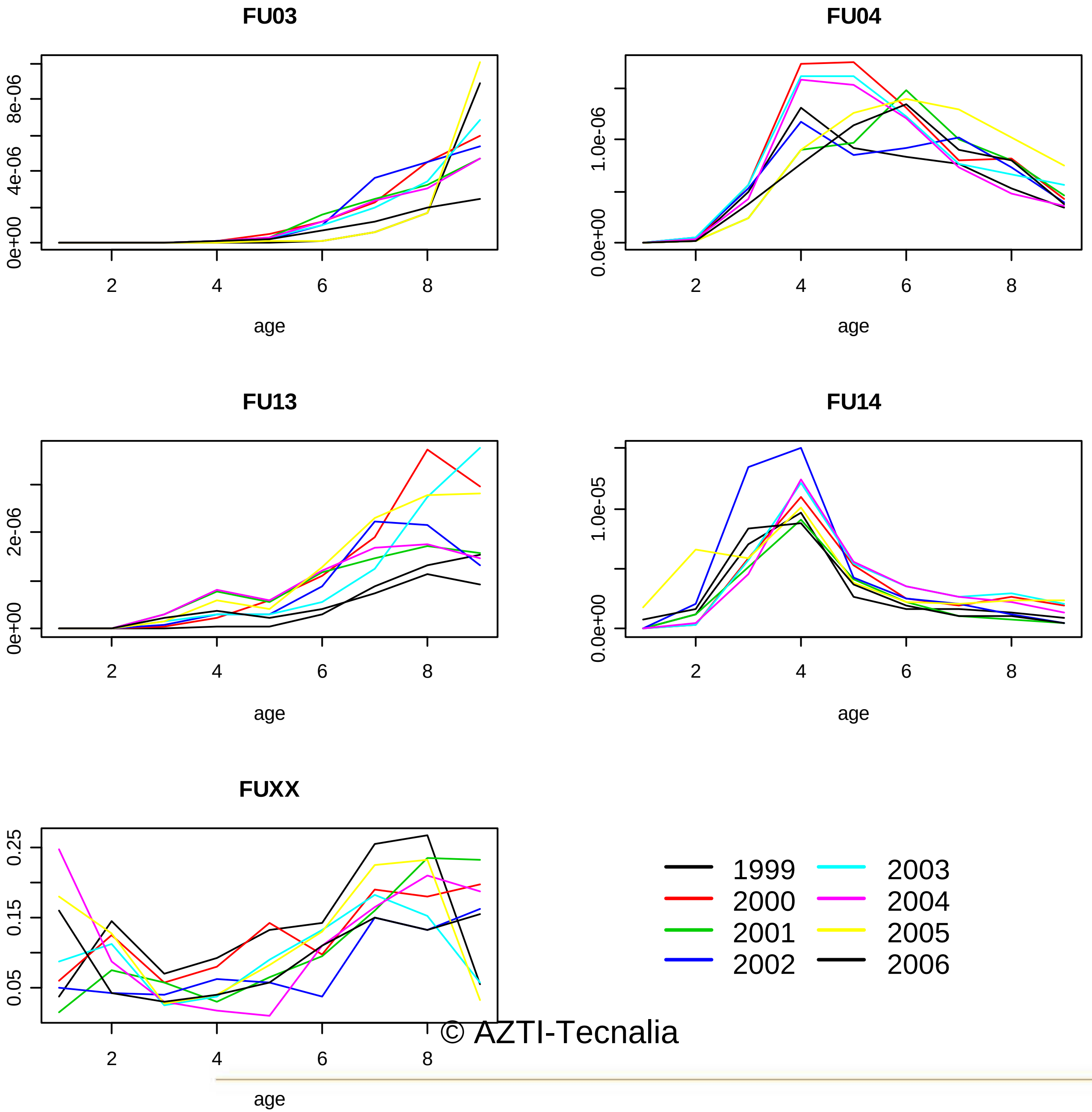
Catch distribution by FU



Landings at age distribution by FU: 1999 - 2006

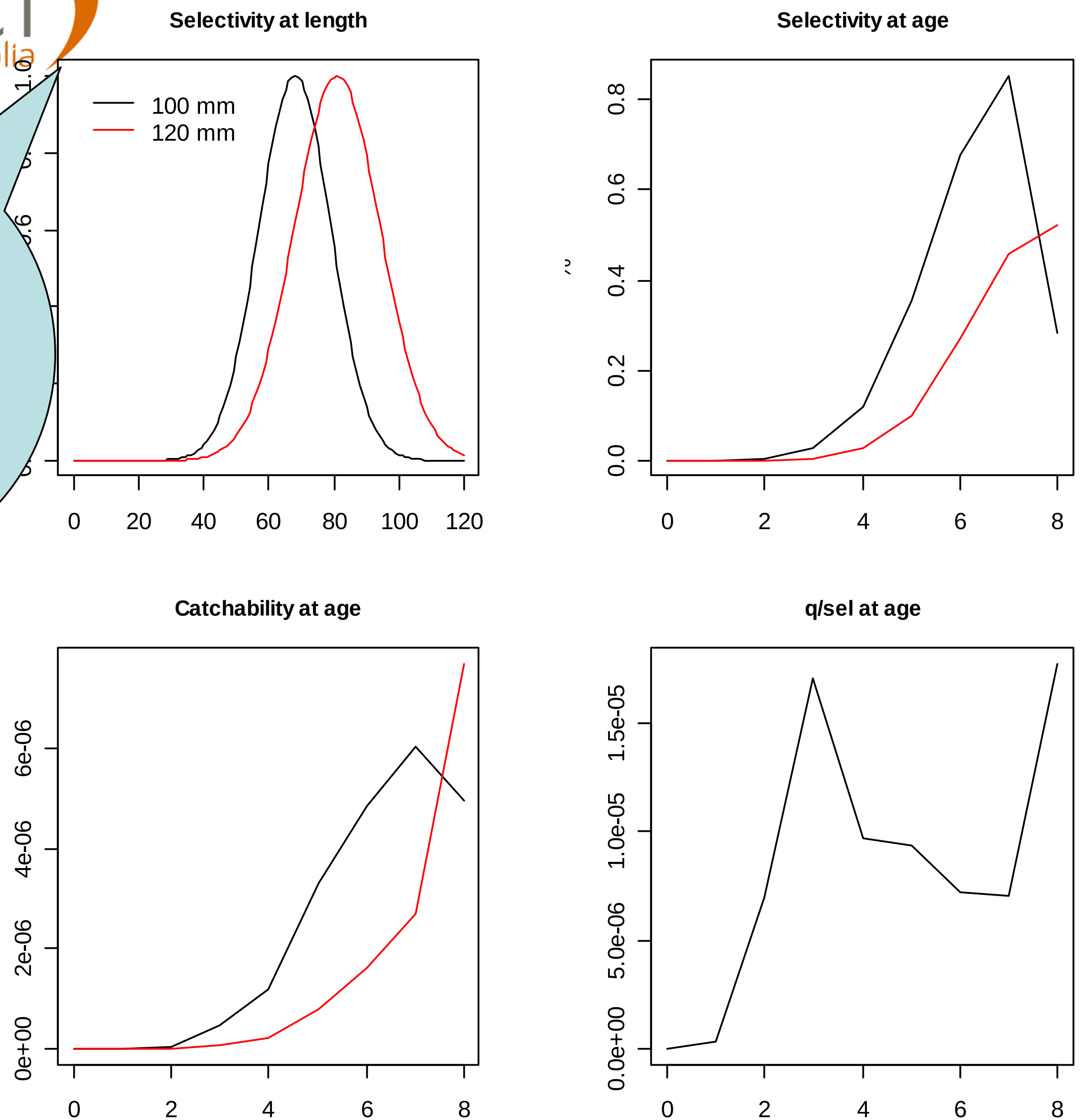


Catchability: 1999 - 2006

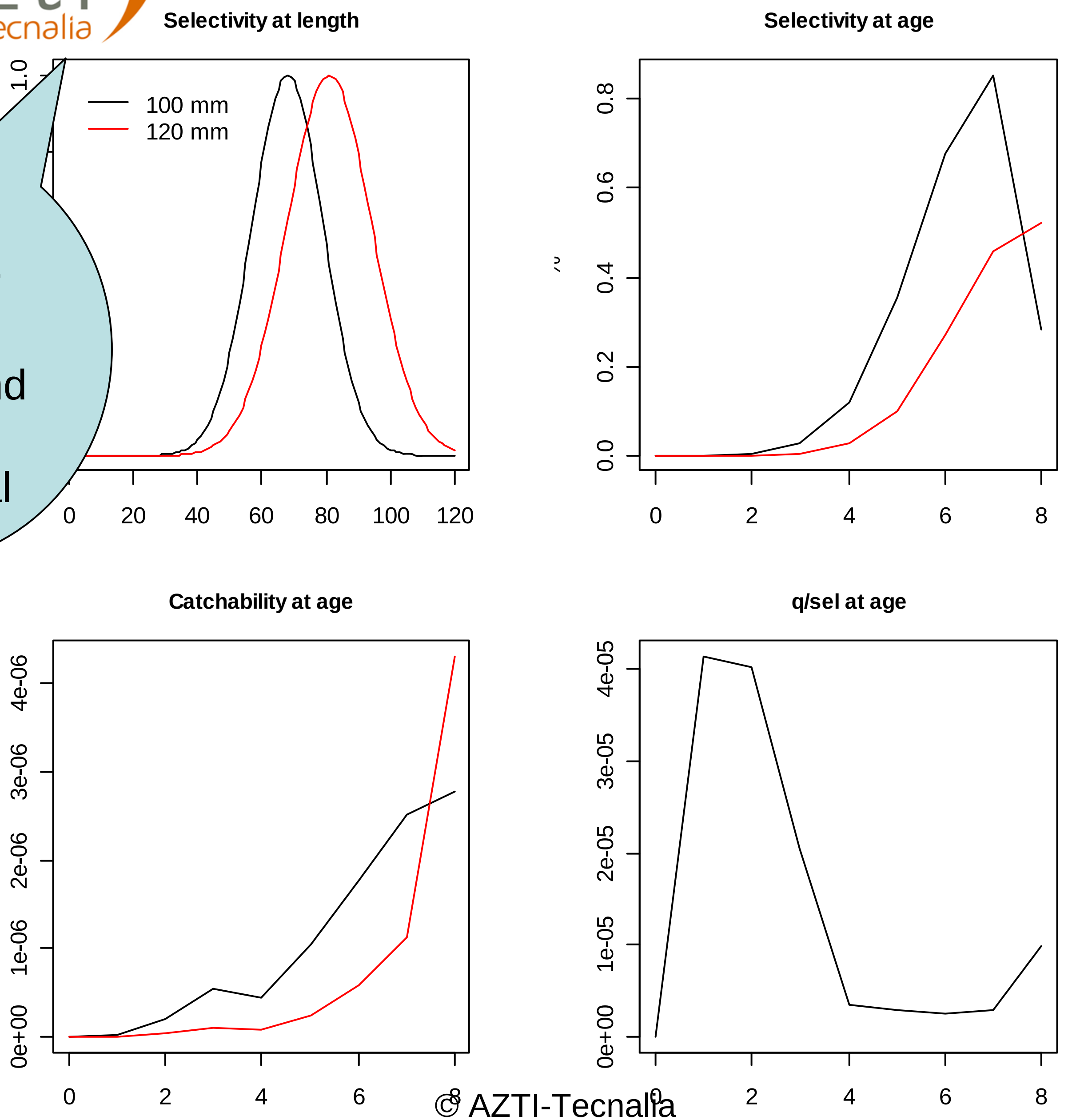


FU03: Gillneters in VII

Selection curves for FU03: (100mm and 120mm) Revill et. al (2006)



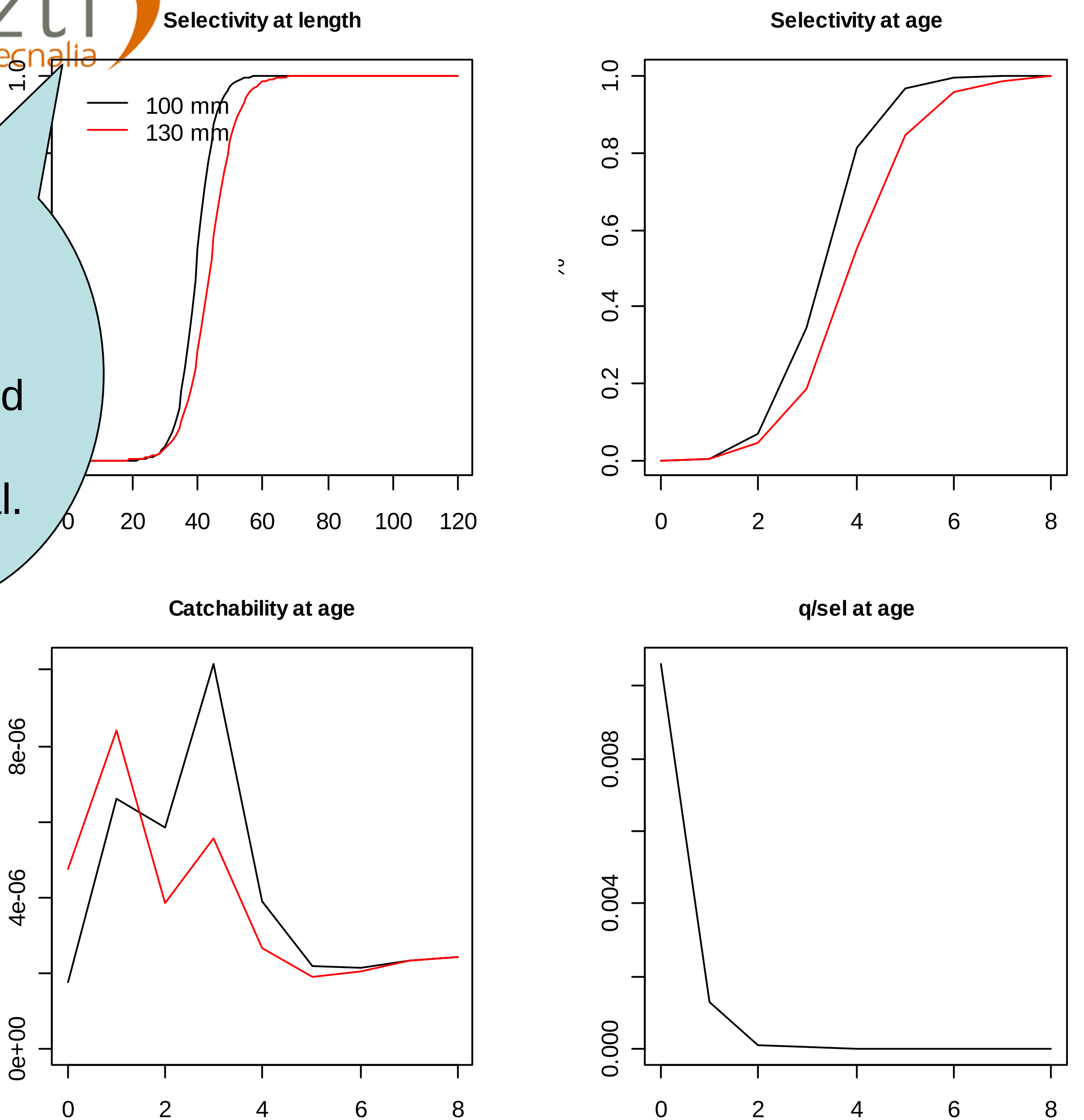
FU13: Gillneters in VIIIabd

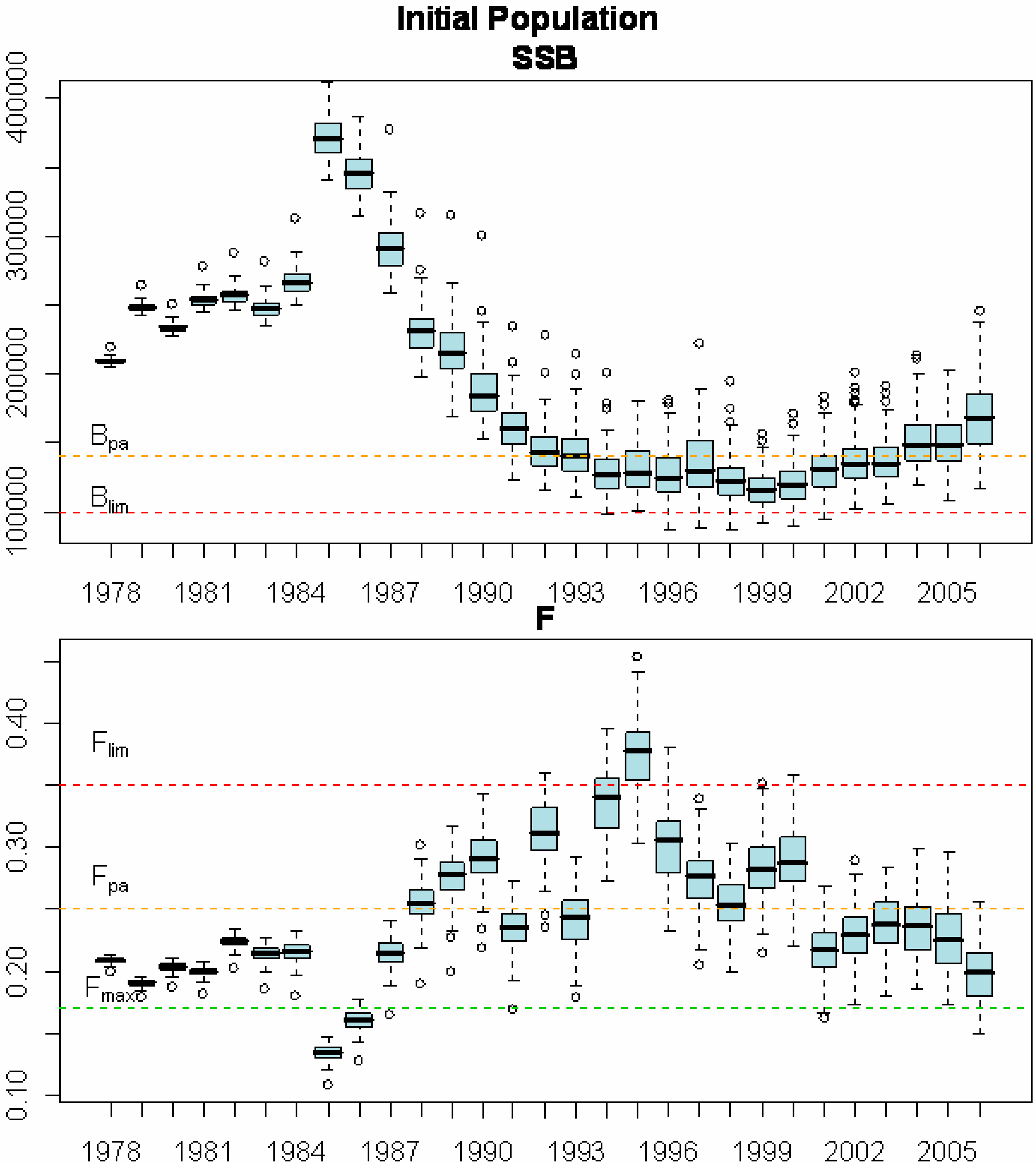


Selection curves for FU13: (100mm and 120mm) Revill et. al (2006)

FU14: Trawlers in VIIIabd

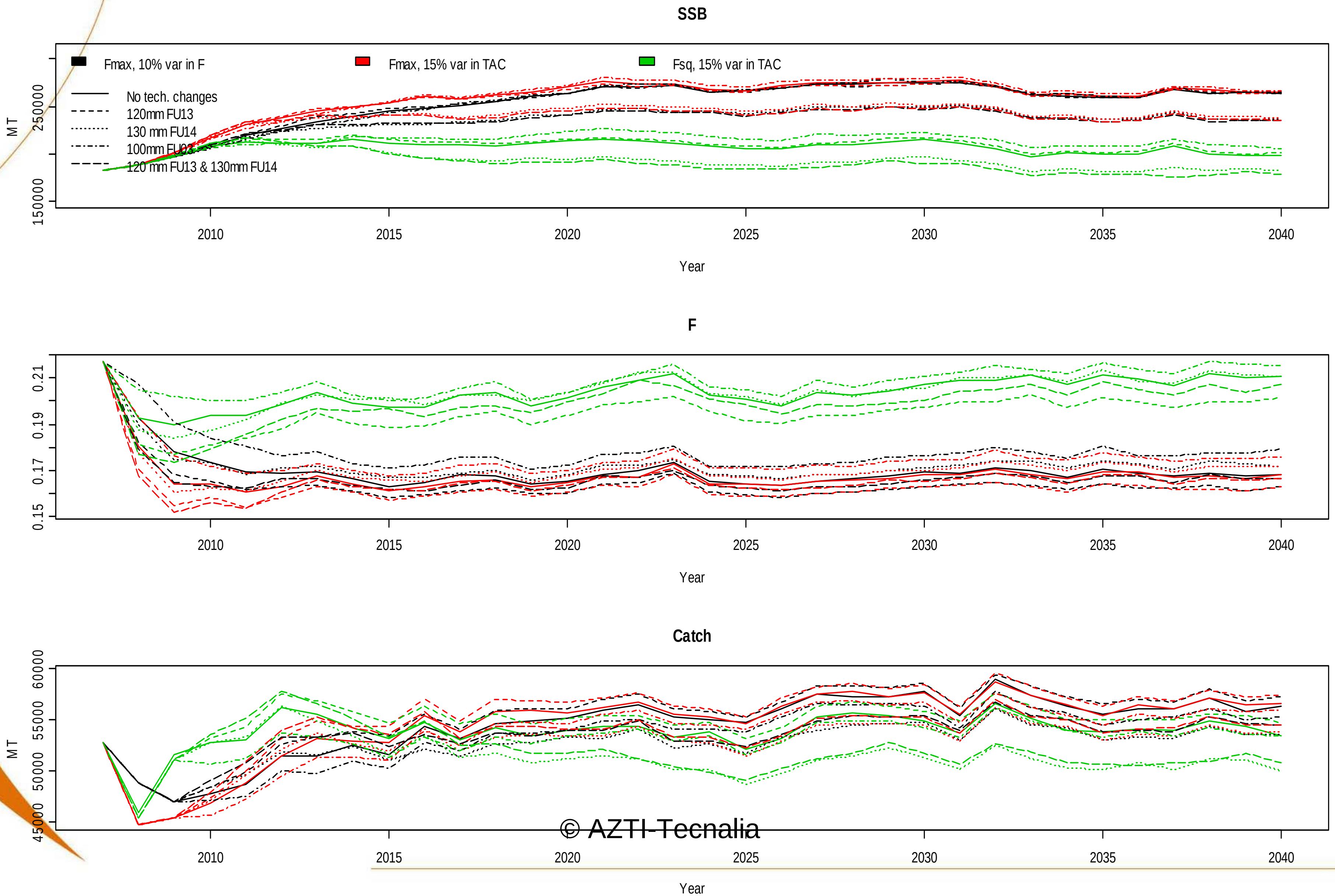
Selection curves for FU14: (100mm and 130mm) Gálvez et al. (2005)

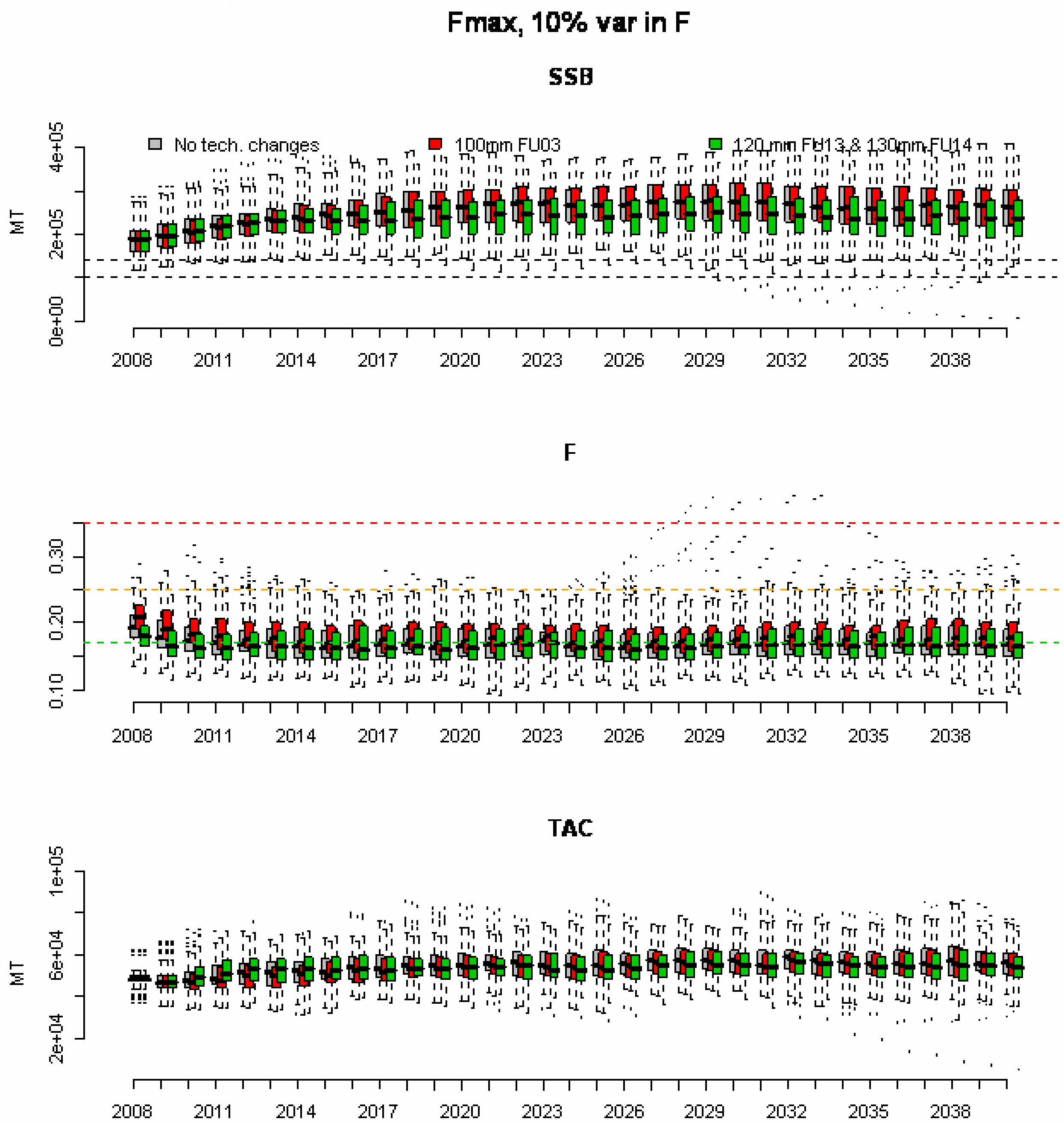


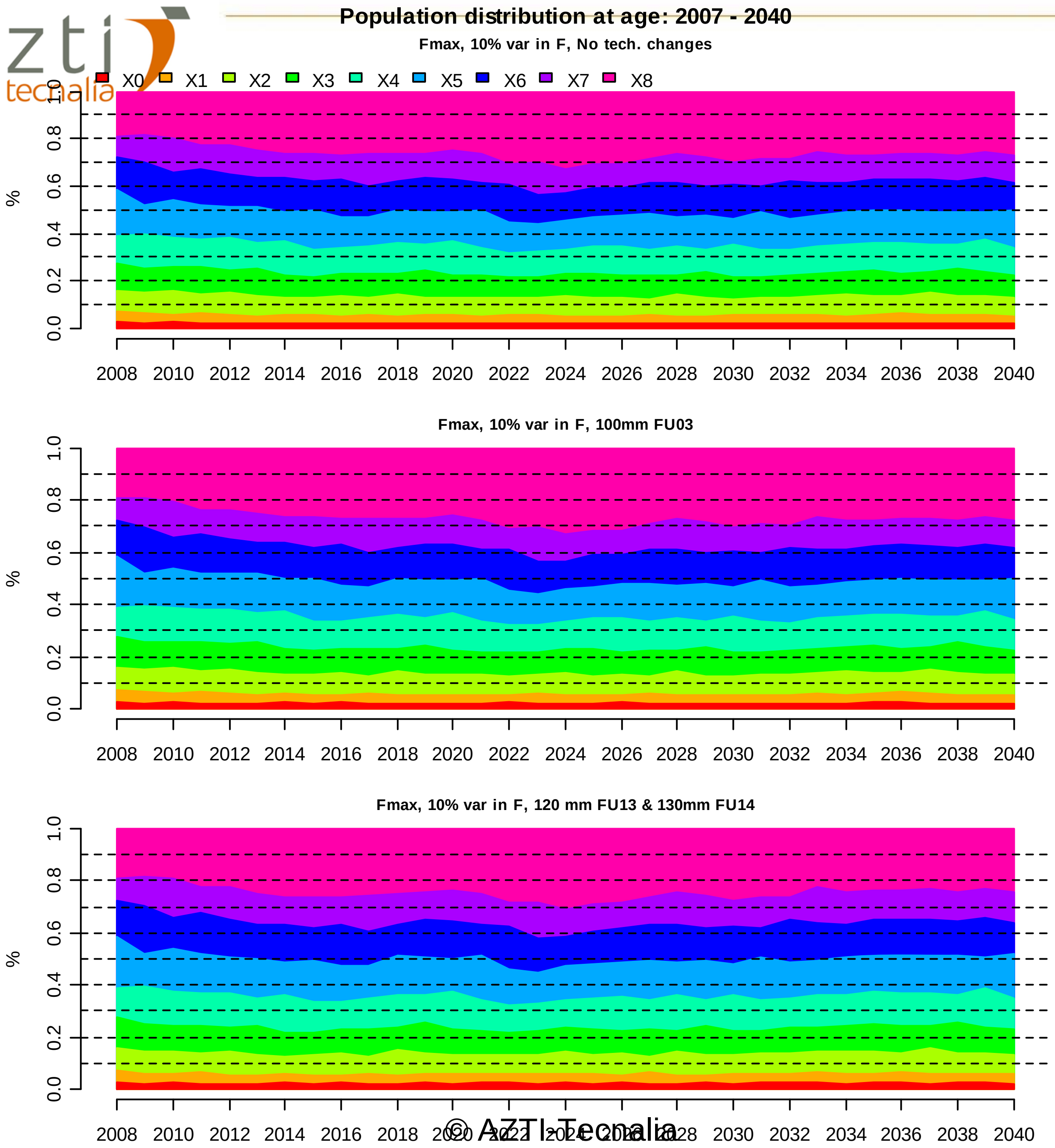


Initial Population
SSB
400000
300000
200000
100000
Bpa
Blim
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005
F
0.40
0.30
0.20
0.10
Flim
Fpa
Fmax
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005

Comparison between scenarios in median

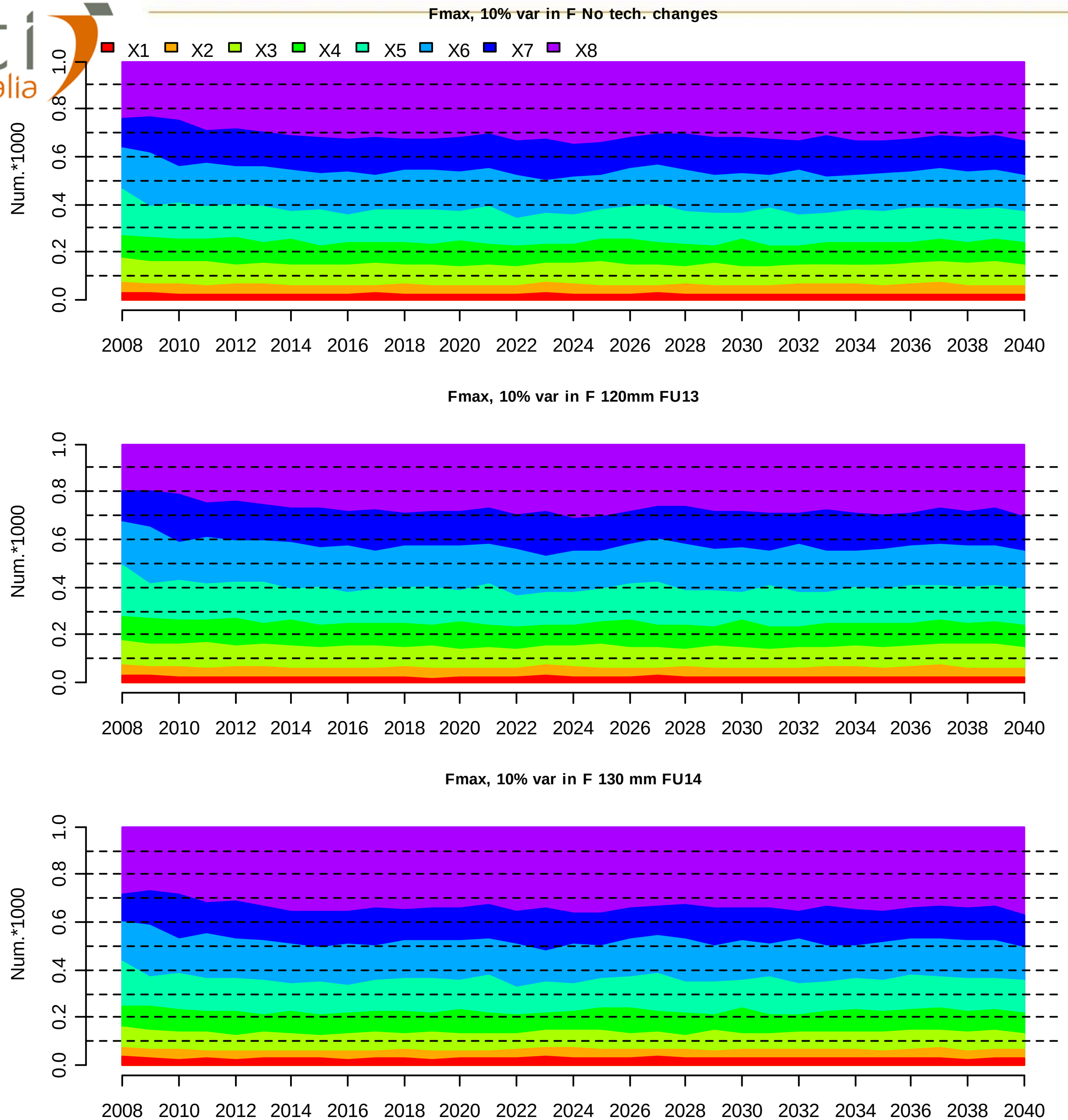



Fmax, 10% var in F
SSB
MT
0e+00
2e+05
4e+05
No tech. changes
100mm FU03
120 mm FU13 & 130mm FU14
2008
2011
2014
2017
2020
2023
2026
2029
2032
2035
2038
F
0.10
0.20
0.30
TAC
2e+04
6e+04
1e+05



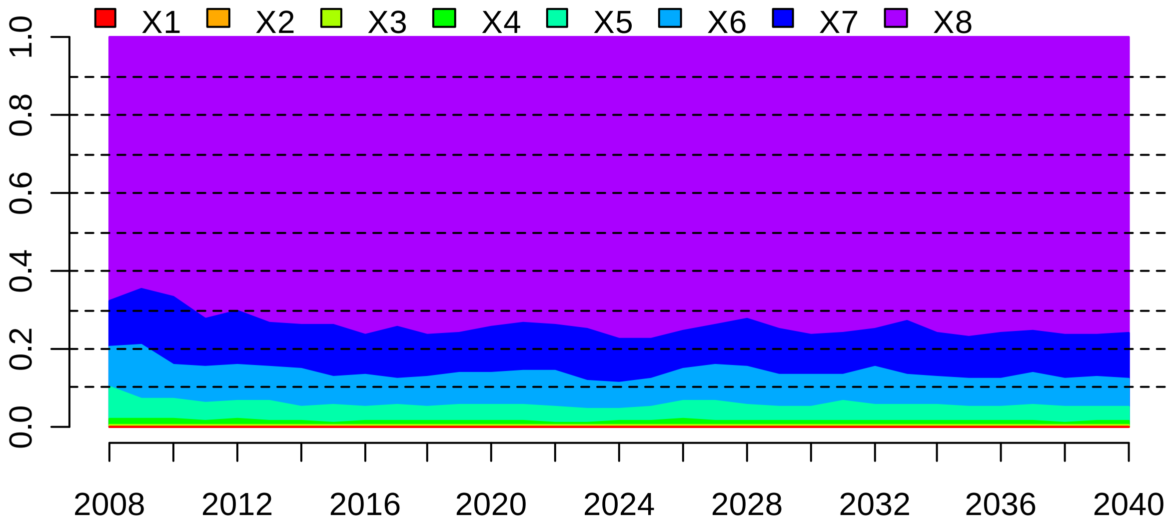
Population distribution at age: 2007 - 2040
Fmax, 10% var in F, No tech. changes
X0 X1 X2 X3 X4 X5 X6 X7 X8
%
0.0 0.2 0.4 0.6 0.8 1.0
2008 2010 2012 2014 2016 2018 2020 2022 2024 2026 2028 2030 2032 2034 2036 2038 2040
Fmax, 10% var in F, 100mm FU03
Fmax, 10% var in F, 120 mm FU13 & 130mm FU14

Catch distribution at age: 2008 - 2040 (wt)

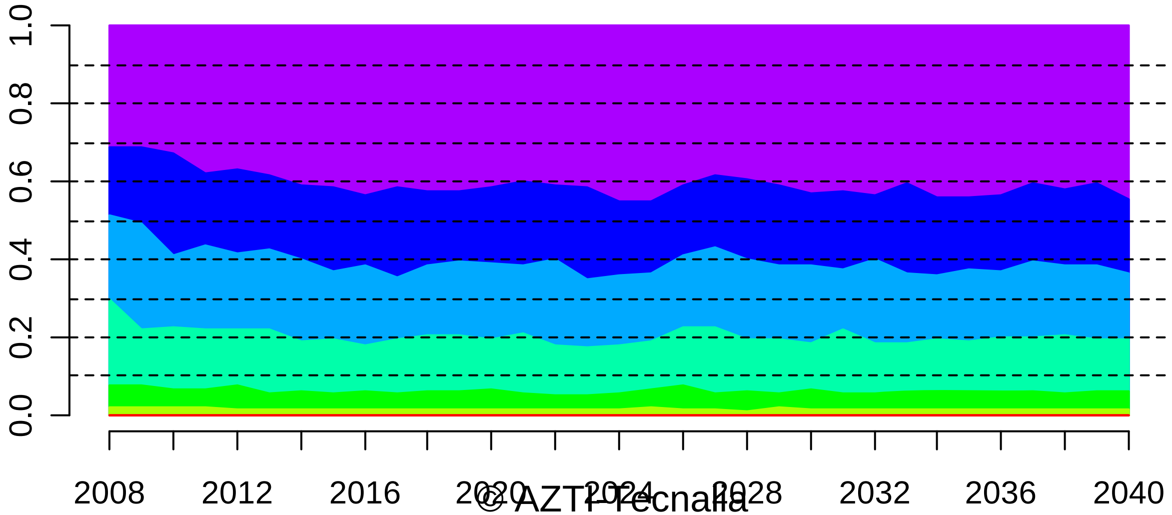


FU03: Landings distribution at age: 2008 - 2040 (wt)

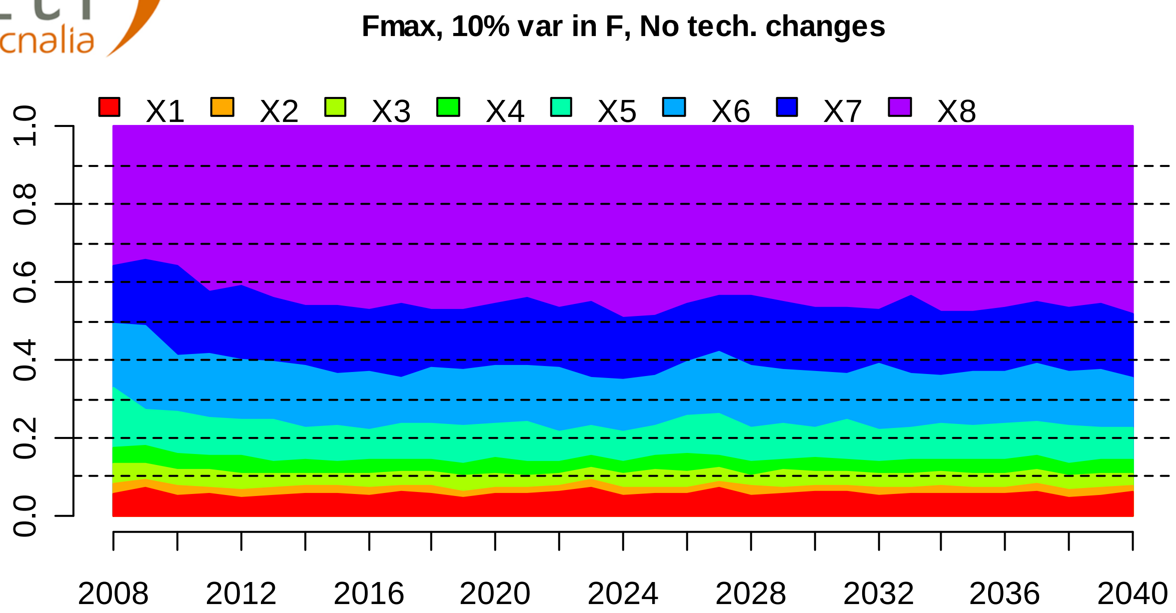
Fmax, 10% var in F, No tech. changes

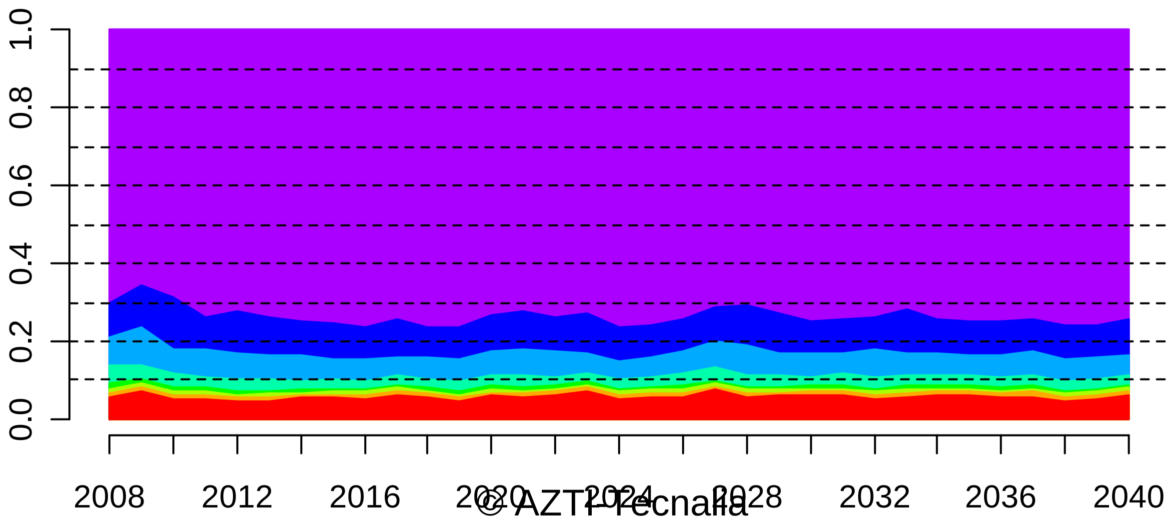


Fmax, 10% var in F, 100mm FU03



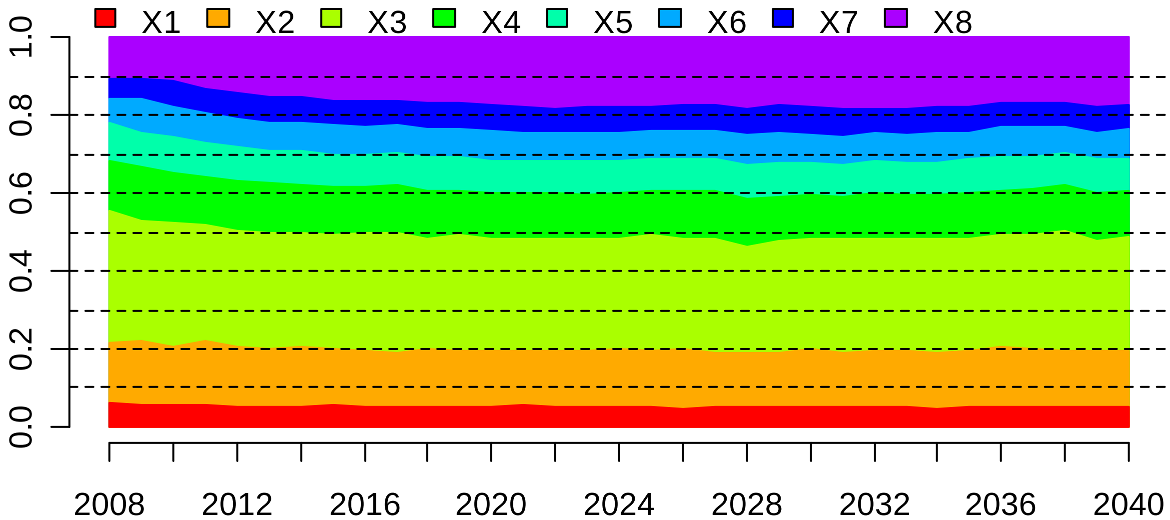
FU13: Catch distribution at age: 2008 - 2040 (wt)



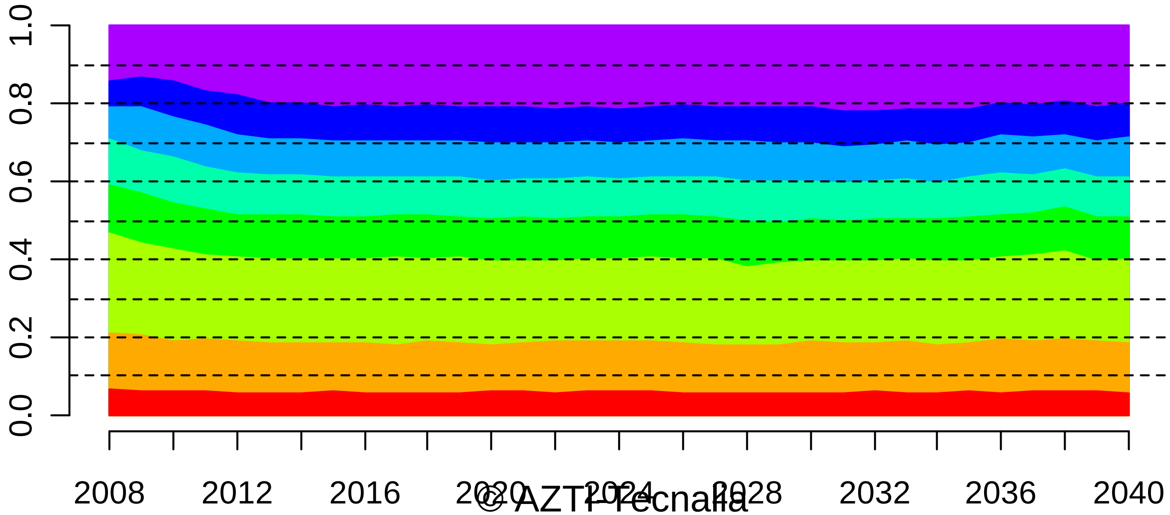


FU14: Catch distribution at age: 2008 - 2040 (wt)

Fmax, 10% var in F, No tech. changes



Fmax, 10% var in F, 120 mm FU13 & 130mm FU14



F median								
		2010	2015	2020	2025	2030	2035	2040
Fmax, 10% Fvar	No Tech. Changes	0.17	0.16	0.17	0.16	0.17	0.17	0.17
	120 mm FU13	0.17	0.16	0.16	0.16	0.16	0.16	0.16
	130 mm FU14	0.17	0.17	0.17	0.17	0.17	0.17	0.17
	100 mm FU03	0.18	0.17	0.17	0.17	0.18	0.18	0.18
	120 mm FU13, 130 mm FU14	0.16	0.16	0.16	0.16	0.17	0.17	0.17
Fmax, 10% Fvar	No Tech. Changes	0.16	0.16	0.16	0.16	0.17	0.17	0.17
	120 mm FU13	0.16	0.16	0.16	0.16	0.16	0.16	0.16
	130 mm FU14	0.16	0.17	0.17	0.17	0.17	0.17	0.17
	100 mm FU03	0.17	0.17	0.17	0.17	0.17	0.18	0.18
	120 mm FU13, 130 mm FU14	0.16	0.16	0.16	0.16	0.17	0.17	0.17
Fsq, 15% TACvar	No Tech. Changes	0.19	0.2	0.2	0.2	0.21	0.21	0.21
	120 mm FU13	0.18	0.19	0.19	0.19	0.2	0.2	0.2
	130 mm FU14	0.19	0.2	0.2	0.2	0.21	0.21	0.21
	100 mm FU03	0.2	0.2	0.2	0.21	0.21	0.22	0.22
	120 mm FU13, 130 mm FU14	0.18	0.2	0.2	0.2	0.2	0.21	0.21

P(F =< Fmax)								
		2010	2015	2020	2025	2030	2035	2040
Fmax, 10% Fvar	No Tech. Changes	0.42	0.56	0.58	0.55	0.51	0.49	0.52
	120 mm FU13	0.62	0.58	0.61	0.63	0.66	0.57	0.61
	130 mm FU14	0.44	0.54	0.52	0.55	0.47	0.44	0.48
	100 mm FU03	0.26	0.49	0.49	0.48	0.43	0.39	0.43
	120 mm FU13, 130 mm FU14	0.62	0.57	0.59	0.58	0.6	0.52	0.55
Fmax, 10% Fvar	No Tech. Changes	0.59	0.57	0.56	0.55	0.53	0.52	0.54
	120 mm FU13	0.76	0.58	0.62	0.63	0.67	0.58	0.62
	130 mm FU14	0.64	0.55	0.53	0.54	0.5	0.44	0.48
	100 mm FU03	0.46	0.54	0.5	0.49	0.45	0.41	0.44
	120 mm FU13, 130 mm FU14	0.76	0.58	0.57	0.59	0.58	0.54	0.55
Fsq, 15% TACvar	No Tech. Changes	0.23	0.21	0.16	0.17	0.11	0.08	0.09
	120 mm FU13	0.33	0.27	0.22	0.29	0.17	0.15	0.17
	130 mm FU14	0.28	0.2	0.15	0.18	0.1	0.08	0.09
	100 mm FU03	0.16	0.2	0.13	0.12	0.07	0.04	0.06
	120 mm FU13, 130 mm FU14	0.35	0.25	0.2	0.25	0.13	0.11	0.09

SSB median								
		2010	2015	2020	2025	2030	2035	2040
Fmax, 10% Fvar	No Tech. Changes	207697	245700	263366	266184	274995	259464	263731
	120 mm FU13	209287	247796	264230	265568	273674	259813	263772
	130 mm FU14	207838	230622	240669	242632	249534	236663	236944
	100 mm FU03	205536	244014	263309	267736	275159	260226	264918
	120 mm FU13, 130 mm FU14	209427	232132	241093	240130	247155	234069	235512
Fmax, 10% Fvar	No Tech. Changes	217593	254335	270404	267056	276437	261508	265430
	120 mm FU13	219160	254196	268415	264889	273773	260656	264840
	130 mm FU14	217769	241059	248092	244865	251352	236551	237975
	100 mm FU03	215490	255238	272081	271015	278988	263876	267065
	120 mm FU13, 130 mm FU14	219334	240672	244891	240443	248017	234423	235950
Fsq, 15% TACvar	No Tech. Changes	208436	211930	214301	204926	214821	199389	197816
	120 mm FU13	211494	215558	215612	208287	216745	201150	200818
	130 mm FU14	209928	201339	194920	188026	197159	181454	182560
	100 mm FU03	207299	216495	223943	215646	222650	208177	205738
	120 mm FU13, 130 mm FU14	211685	199877	191590	184735	190194	178789	178513

P(SSB =< Bpa)								
		2010	2015	2020	2025	2030	2035	2040
Fmax, 10% Fvar	No Tech. Changes	0.02	0	0	0	0.01	0.01	0.01
	120 mm FU13	0.01	0	0	0	0.01	0.01	0.01
	130 mm FU14	0.01	0.01	0.02	0.02	0.04	0.02	0.04
	100 mm FU03	0.03	0	0	0	0.01	0.02	0.01
	120 mm FU13, 130 mm FU14	0.01	0	0.02	0.02	0.04	0.02	0.04
Fmax, 10% Fvar	No Tech. Changes	0.02	0	0	0	0.01	0.01	0
	120 mm FU13	0.02	0	0.01	0	0.01	0.01	0
	130 mm FU14	0.02	0	0.01	0	0.04	0.01	0.02
	100 mm FU03	0.02	0	0	0	0.01	0.01	0
	120 mm FU13, 130 mm FU14	0.02	0	0.01	0.01	0.04	0.01	0.02
Fsq, 15% TACvar	No Tech. Changes	0.03	0.07	0.13	0.12	0.12	0.09	0.13
	120 mm FU13	0.03	0.04	0.11	0.11	0.11	0.09	0.11
	130 mm FU14	0.03	0.1	0.23	0.2	0.19	0.24	0.2
	100 mm FU03	0.03	0.06	0.07	0.08	0.09	0.06	0.06
	120 mm FU13, 130 mm FU14	0.03	0.09	0.23	0.23	0.22	0.26	0.27

Catch								
		2010	2015	2020	2025	2030	2035	2040
Fmax, 10% Fvar	No Tech. Changes	47687	51593	55138	54643	57662	55458	56288
	120 mm FU13	48459	53355	56060	55295	58491	56530	57246
	130 mm FU14	48333	51047	53246	51720	54753	53008	53576
	100 mm FU03	47118	50265	53908	53764	56315	54408	55281
	120 mm FU13, 130 mm FU14	49012	52345	53887	52401	55299	53831	54502
Fmax, 10% Fvar	No Tech. Changes	46756	52777	55678	54620	57621	55396	56588
	120 mm FU13	47315	54274	56698	55173	58427	56228	57344
	130 mm FU14	47109	51937	53416	51466	54441	52958	53763
	100 mm FU03	45695	51024	54533	54031	56638	54406	55831
	120 mm FU13, 130 mm FU14	47807	53530	54005	52203	55203	53631	54480
Fsq, 15% TACvar	No Tech. Changes	52738	53117	53907	52105	54828	53765	53331
	120 mm FU13	53146	54596	55072	53143	55784	55014	54707
	130 mm FU14	52684	51493	51142	48620	51299	50106	49925
	100 mm FU03	50627	51336	53415	51582	54202	53248	53412
	120 mm FU13, 130 mm FU14	53465	53227	51702	49017	51673	50641	50799

CONCLUSIONS

- Results obtained in the scenarios in which increases in mesh sizes are simulated are highly dependent in the selectivity curves used, which are taken from the literature and do not correspond with the FUs considered in this study.
- However the selection curves used belong to fisheries with similar gear characteristics and same hake morphology. Anyway further investigation in the suitability of selection curves used would be appropriate.
- Inclusion of discards in the simulation gives a more realistic idea of the scenarios .

CONCLUSIONS II…

- Individual increase or decreases in the mesh sizes (depending on the fleet segment) appears not to have significant impact in the population.
- If no changes in population are identified, studies on changes in mesh have to be based on economic studies and profitability of the fleets.
- There are significant changes in the landings distribution at age of the fleets in which changes in mesh sizes are made, but in the total catches distribution there is no a big impact.
- What it is presumed from this study is that, to have a significant impact in the population due to increment in mesh sizes, these should be increased greatly.
- If changes in mesh sizes are to be proposed these have to be done based on scientific experiences.

CONCLUSIONS III

- In the scenarios run what **makes a difference in the long term is the Ftarget used**, and **in the short term both Ftarget and variation constraint used and not the increase or decrease in mesh sizes.**

- **In the short term maximum annual variations in F of 10% give higher catches than maximum variations in TAC of a 15% but in the long term both give very similar results.**

- **All the strategies achieve their Ftarget by 2015 and give similar catches in the long term but the probability of being below Bpa is higher in the strategy with Ftarget equal to Fsq.**