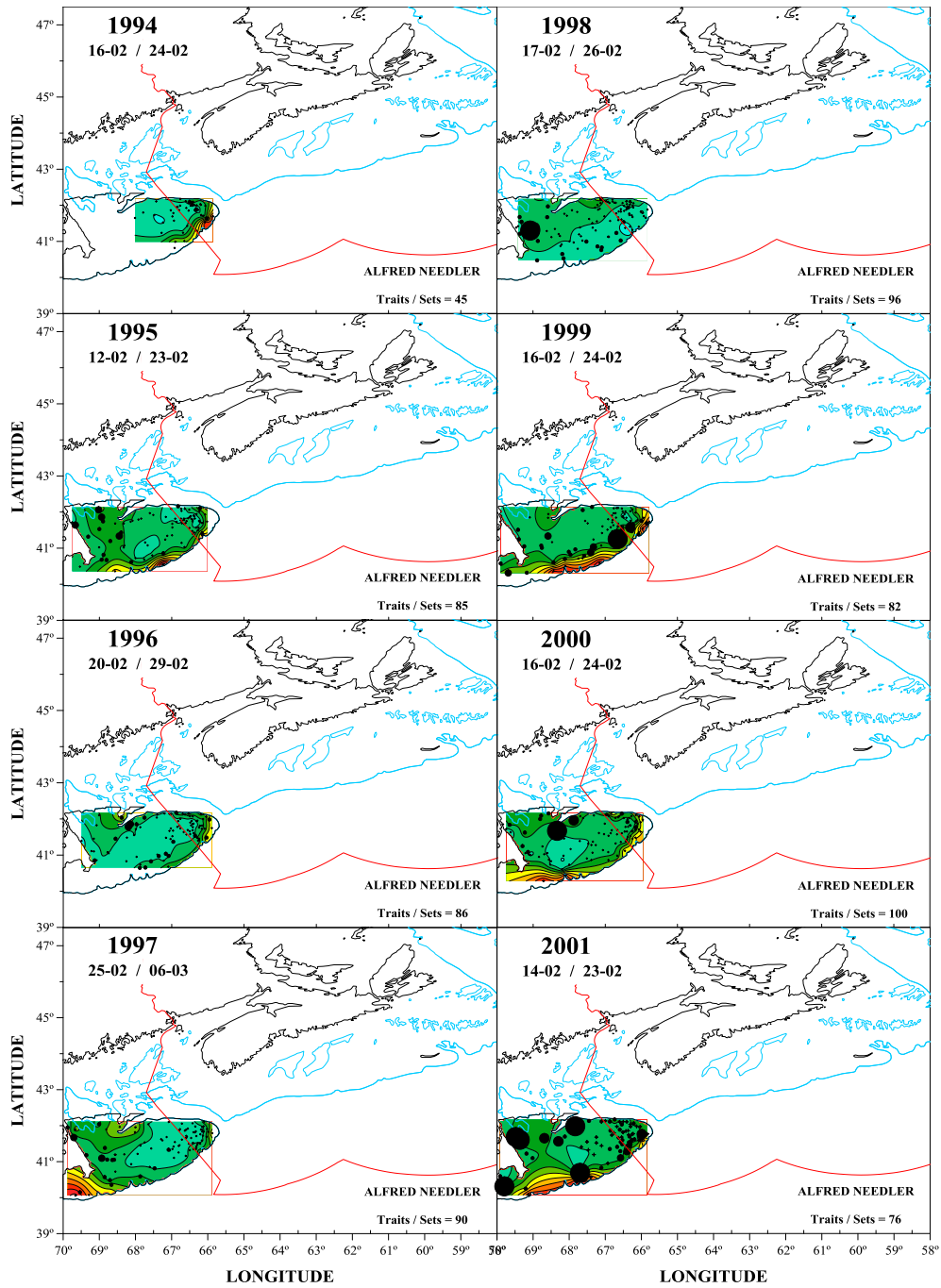


Figure 41. Atlantic mackerel catch rates (number by set) and bottom temperature (°C) of the Georges Bank assessment survey for the 1986-2011 period.



Légende / Legend:

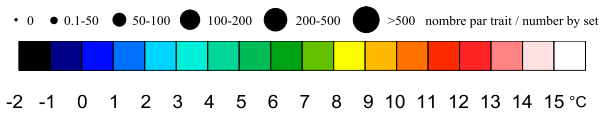
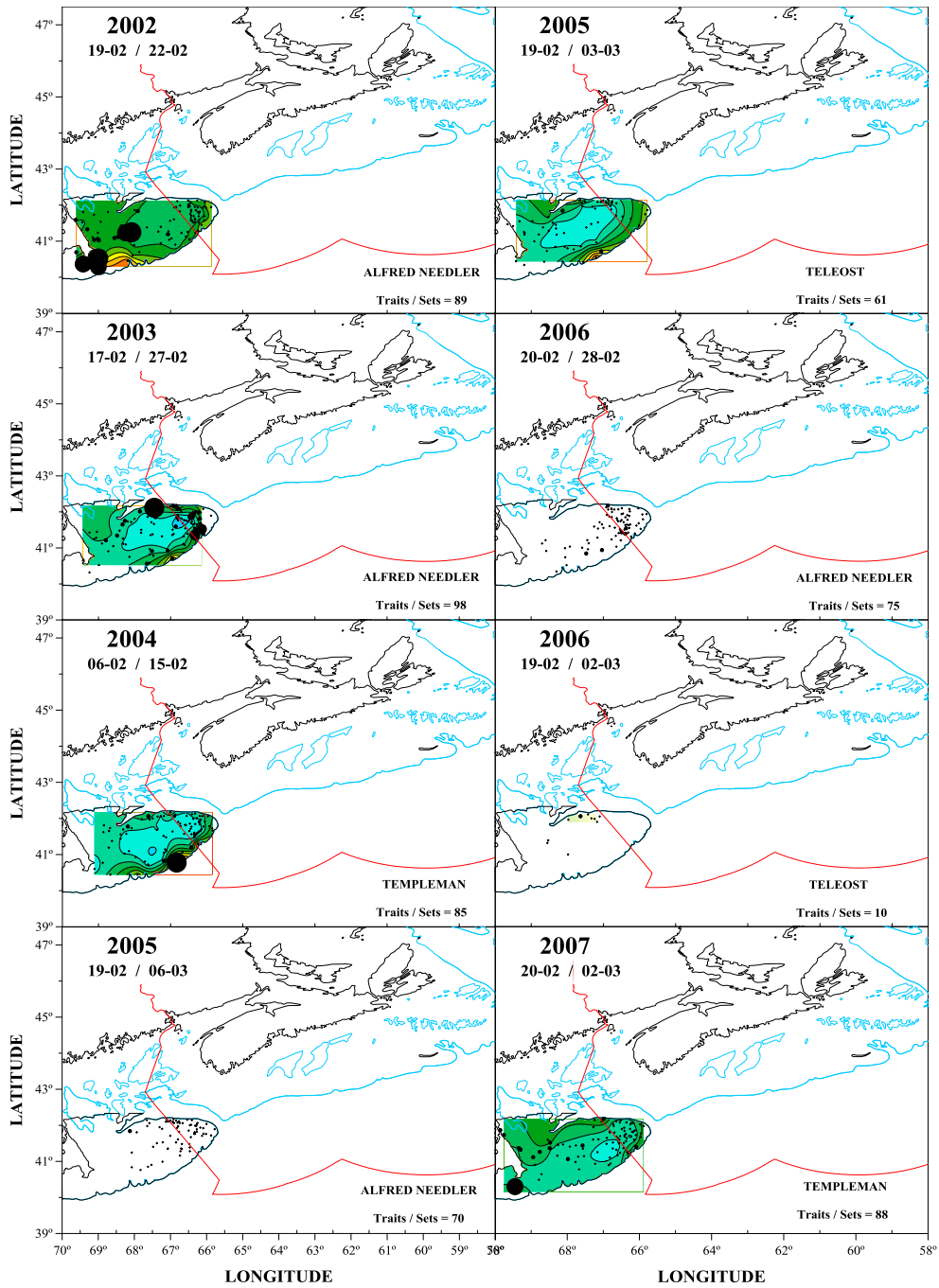


Figure 41. (Continued).



Légende / Legend:

• 0 • 0.1-50 • 50-100 • 100-200 • 200-500 • >500 nombre par trait / number by set

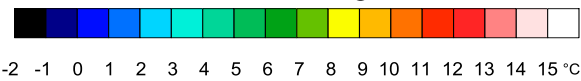
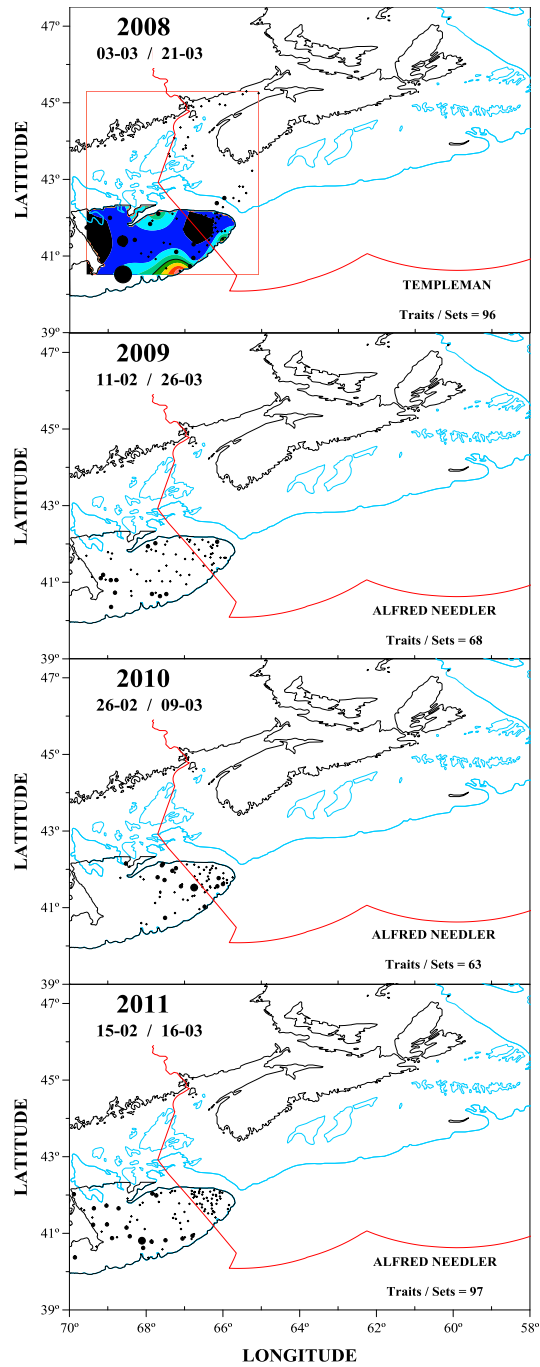


Figure 41. (Continued).



Légende / Legend:

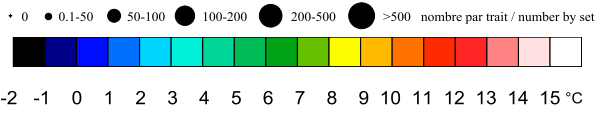


Figure 41. (Continued).

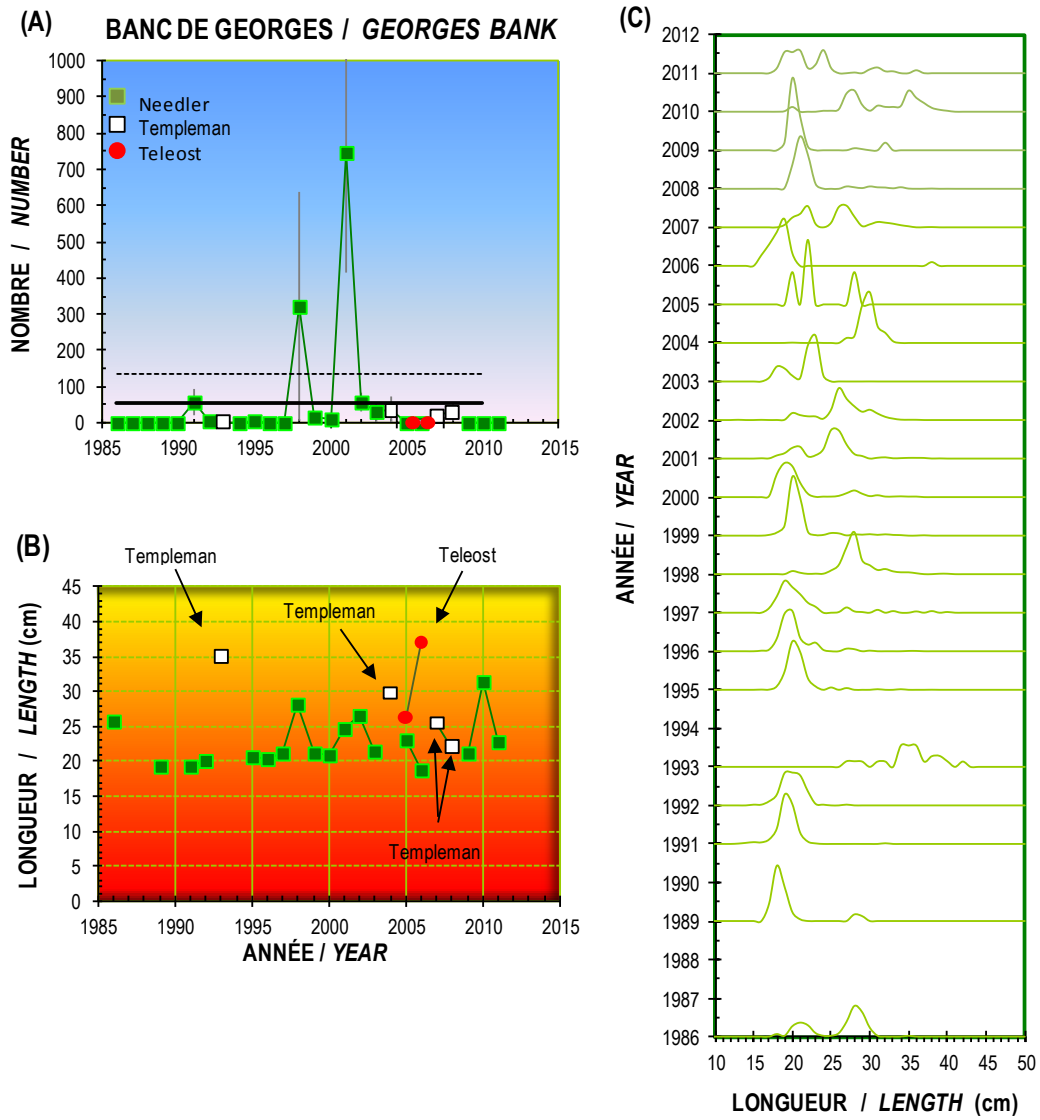


Figure 42. Mean number of Atlantic mackerel per set (A), mean length (cm) (B), and length frequencies (cm) (C) of the Georges Bank assessment survey for the 1986-2011 period (horizontal lines in A represent the average of the 1986-2010 period  $\pm$  0.5 standard deviation).

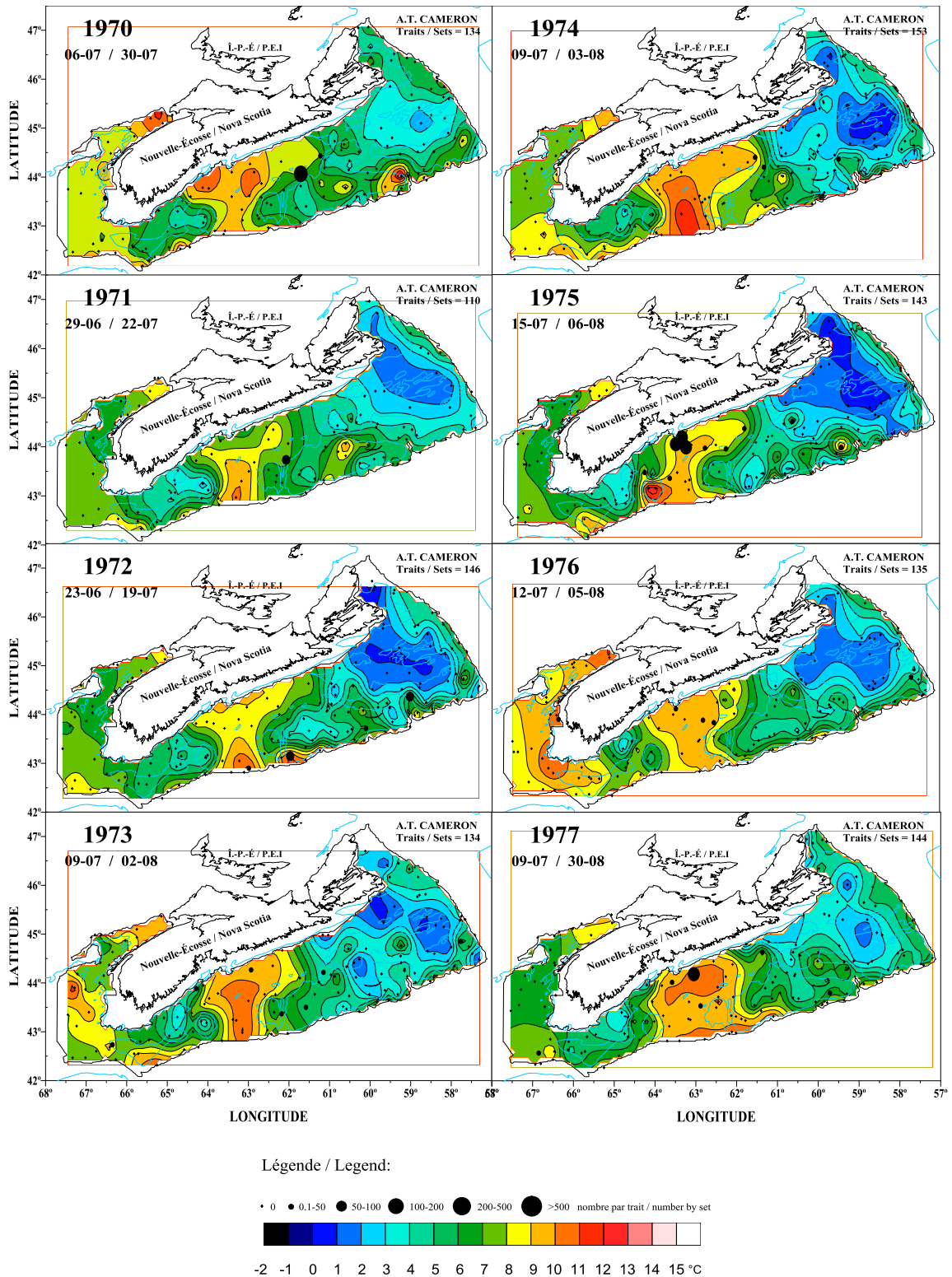


Figure 43. Atlantic mackerel catch rates (number by set) and bottom temperature (°C) of the summer assessment survey in NAFO Divisions 4VWX for the 1970-2011 period.

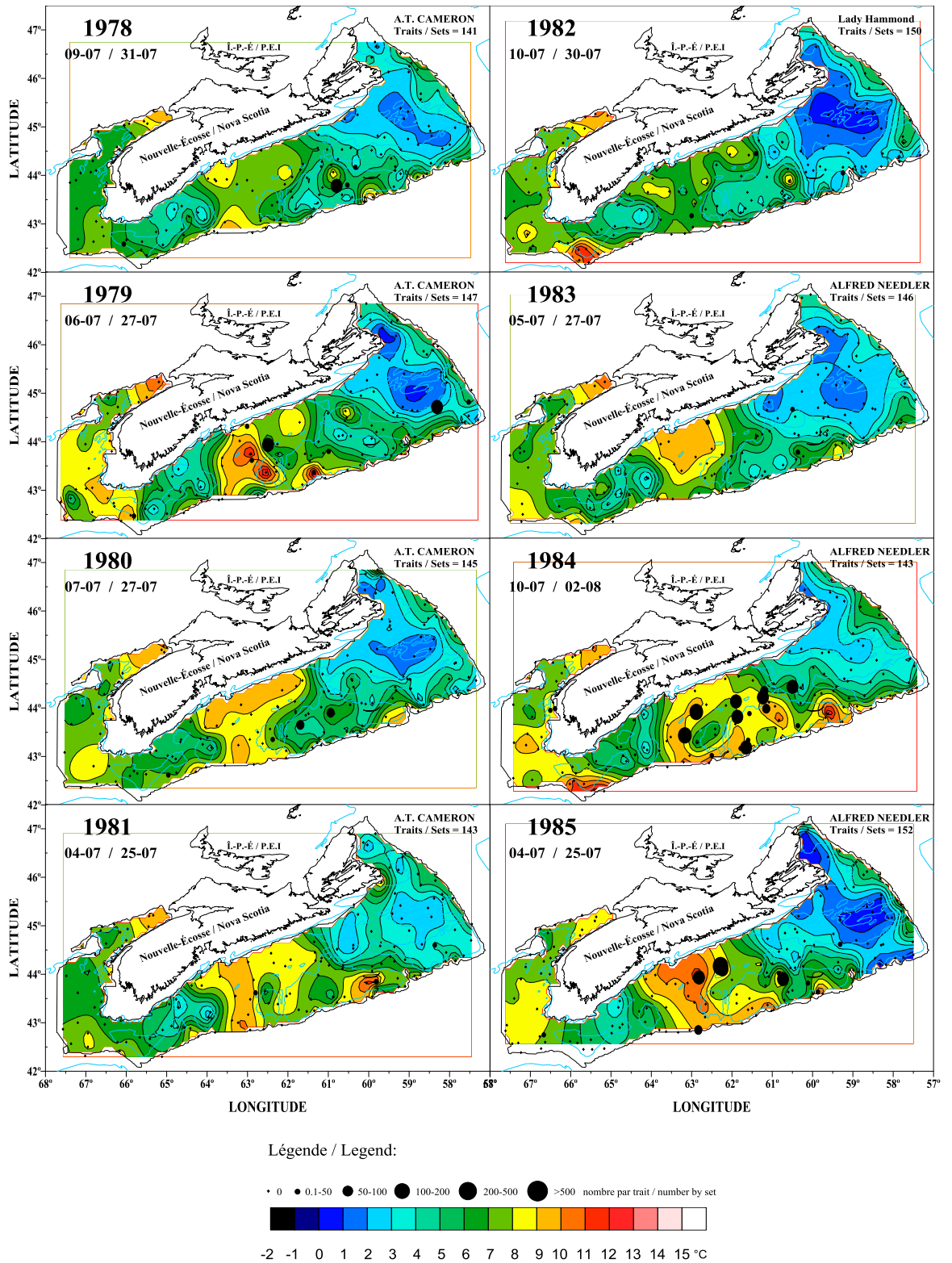


Figure 43. (Continued).

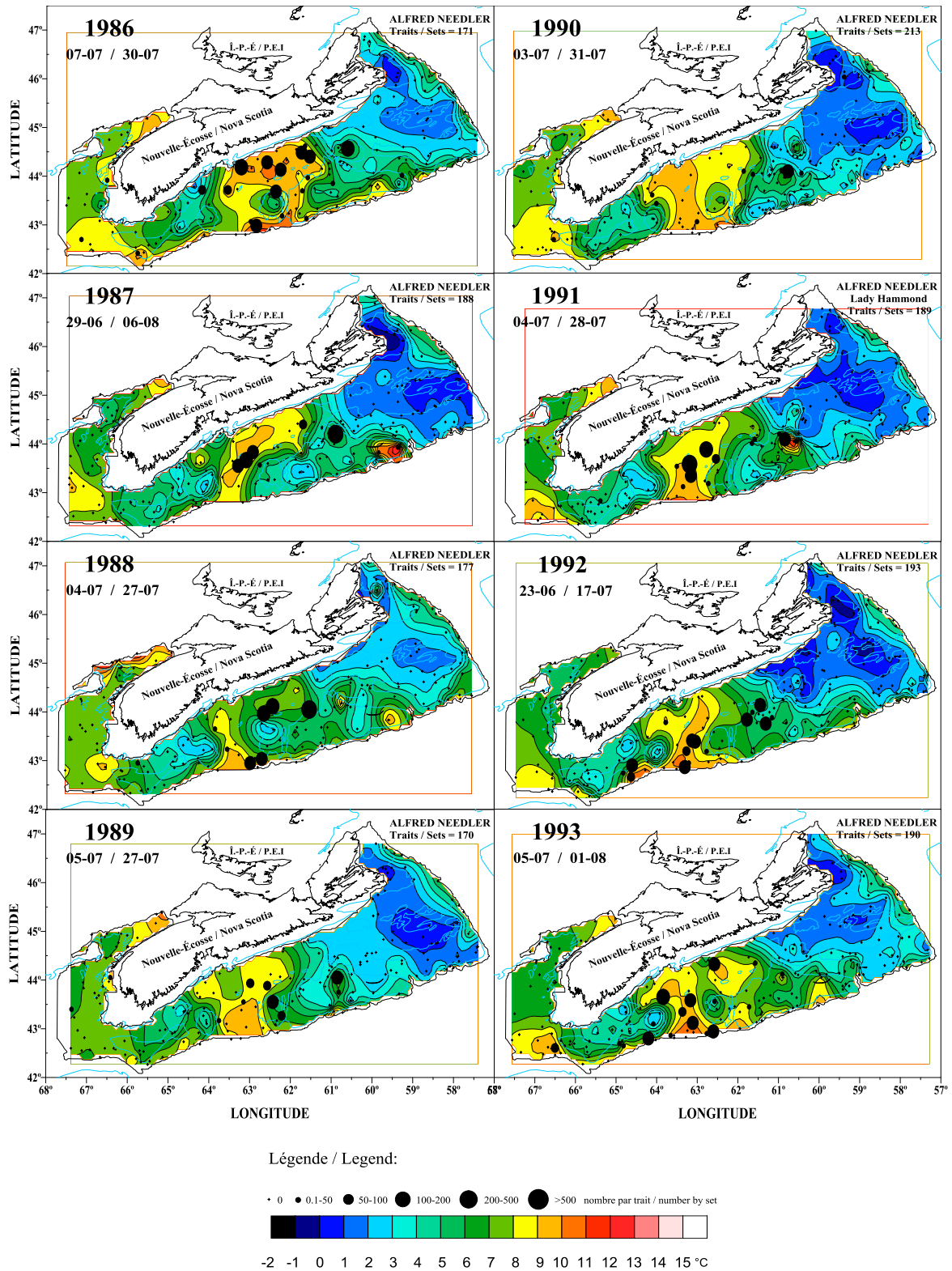
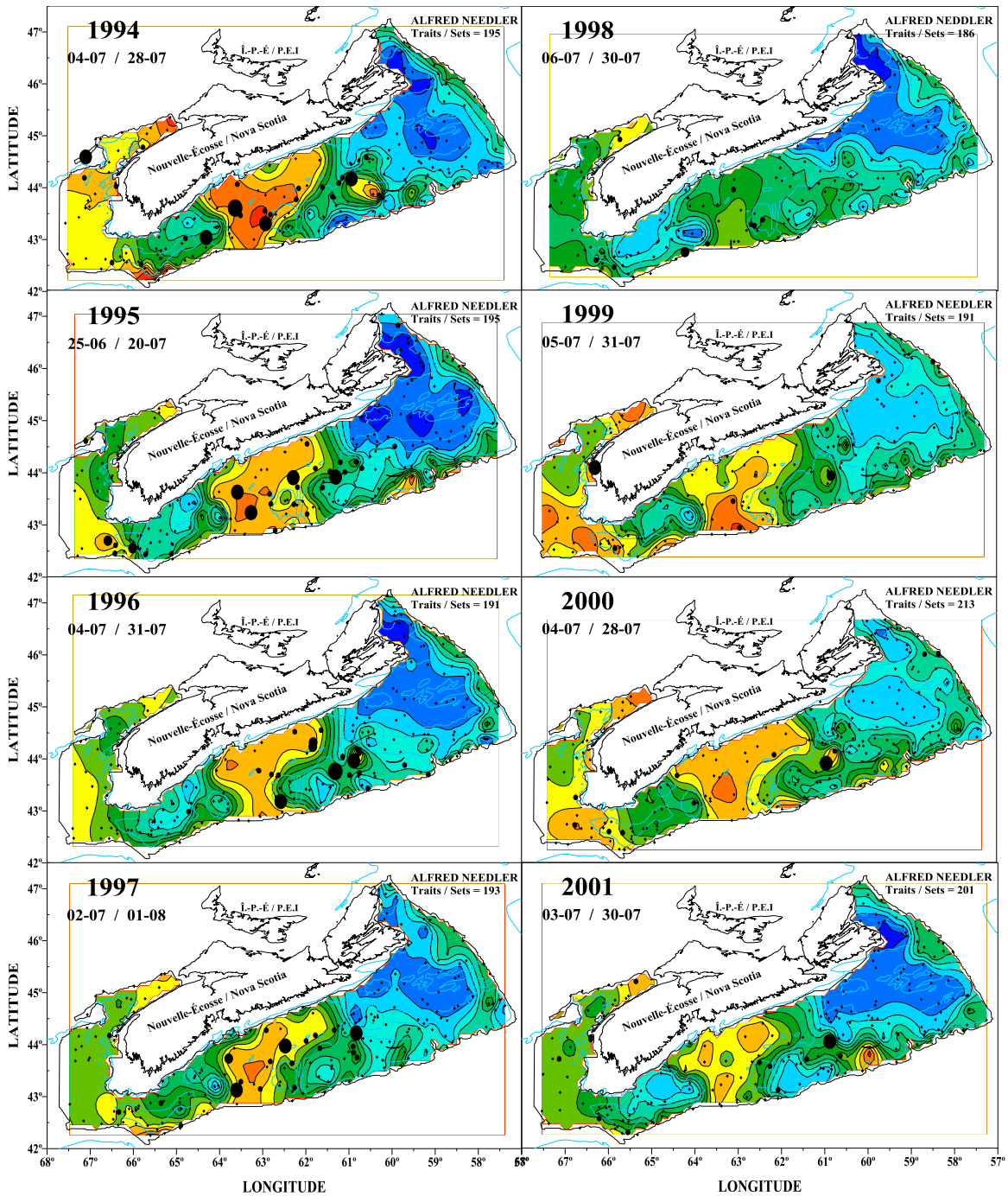


Figure 43. (Continued).





Légende / Legend:

• 0 • 0.1-50 • 50-100 • 100-200 • 200-500 • >500 nombre par trait / number by set



-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 °C

Figure 43. (Continued).

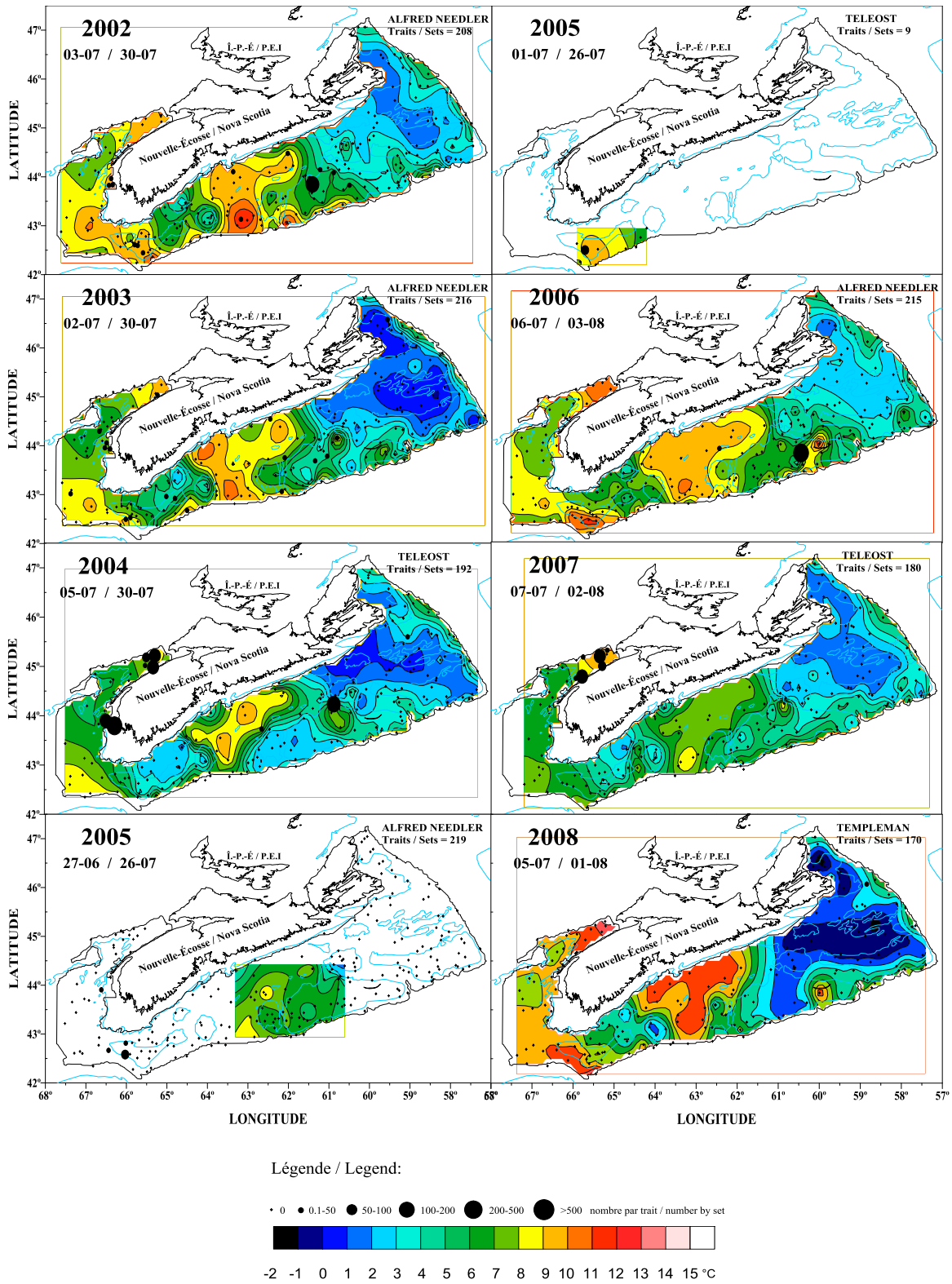


Figure 43. (Continued).

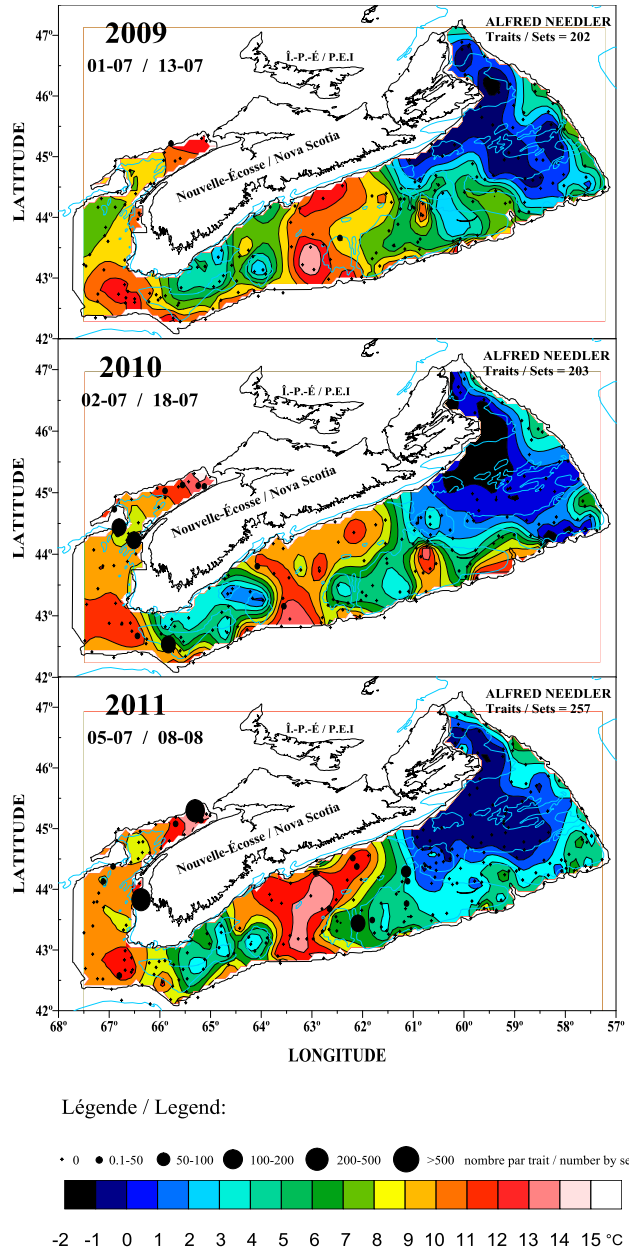


Figure 43. (Continued).

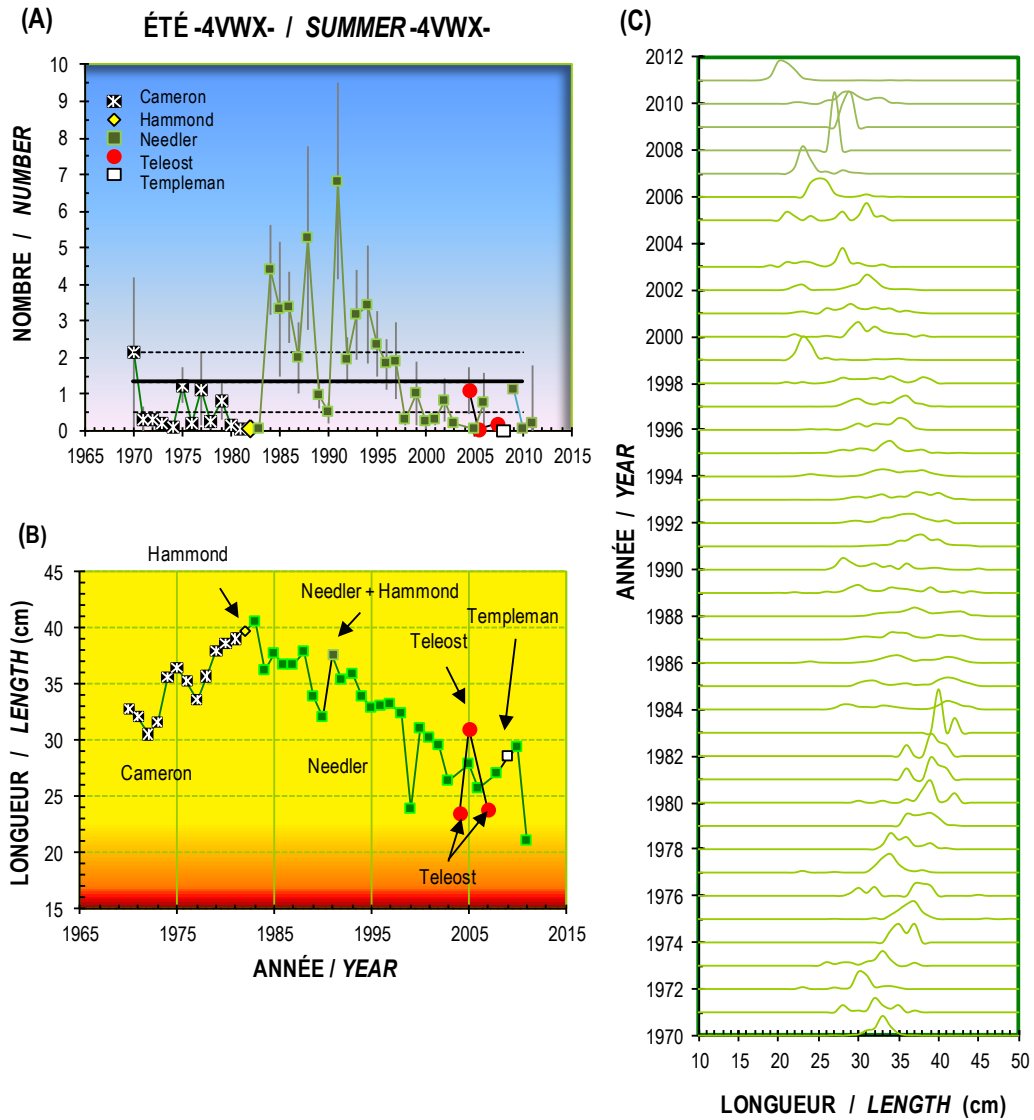


Figure 44. Mean number of Atlantic mackerel per set (A), mean length (cm) (B), and length frequencies (cm) (C) of the summer assessment survey of NAFO Divisions 4VWX for the 1970-2011 period (horizontal lines in A represent the average of the 1970-2010 period  $\pm$  0.5 standard deviation).

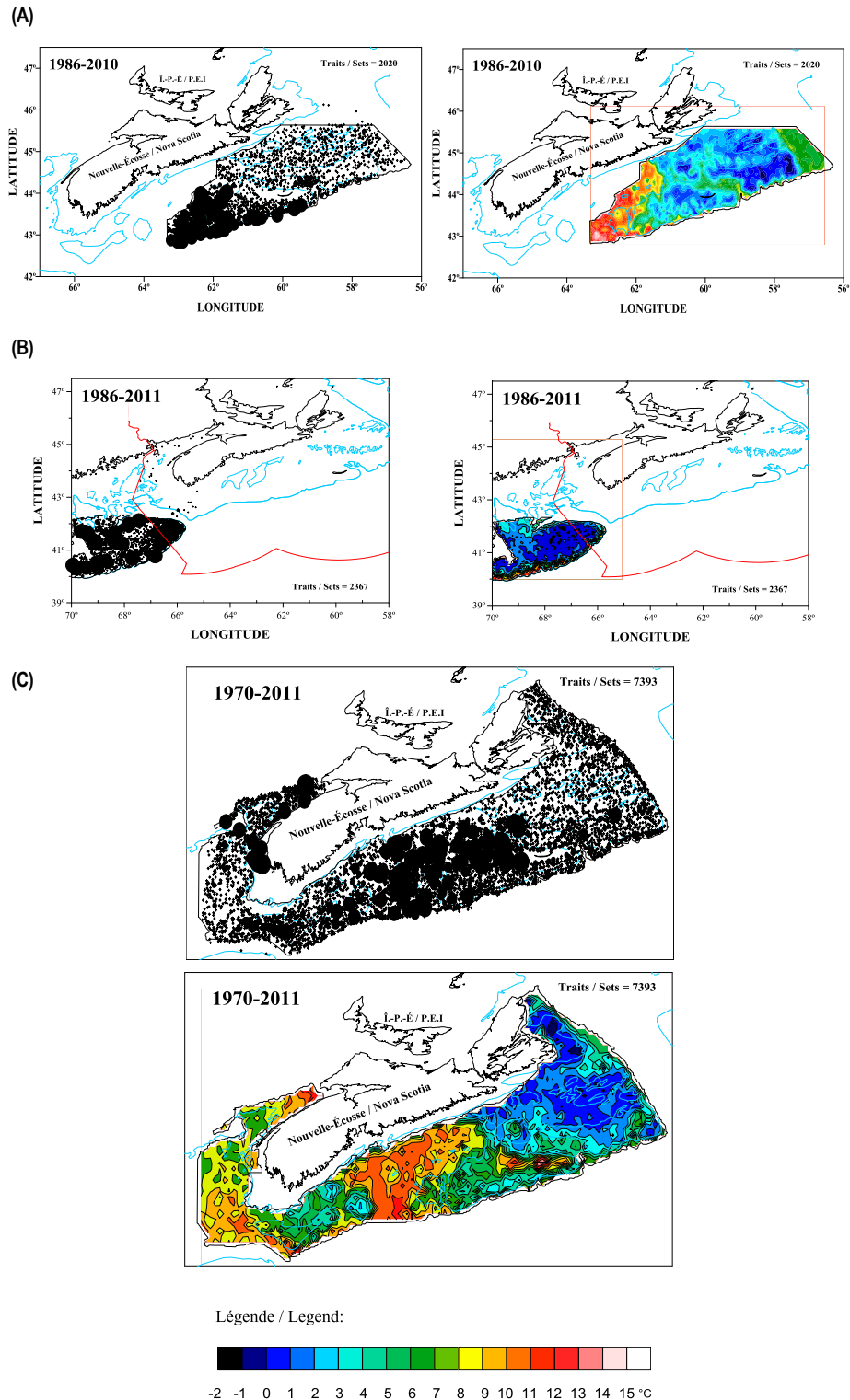


Figure 45. Composite maps of the Atlantic mackerel catch rates (number / set) and bottom temperature ( $^{\circ}\text{C}$ ) of the following surveys: (A) 4VW cod (1986-2010), (B) Georges Bank (1986-2011), and (C) summer 4VWX (1970-2011).

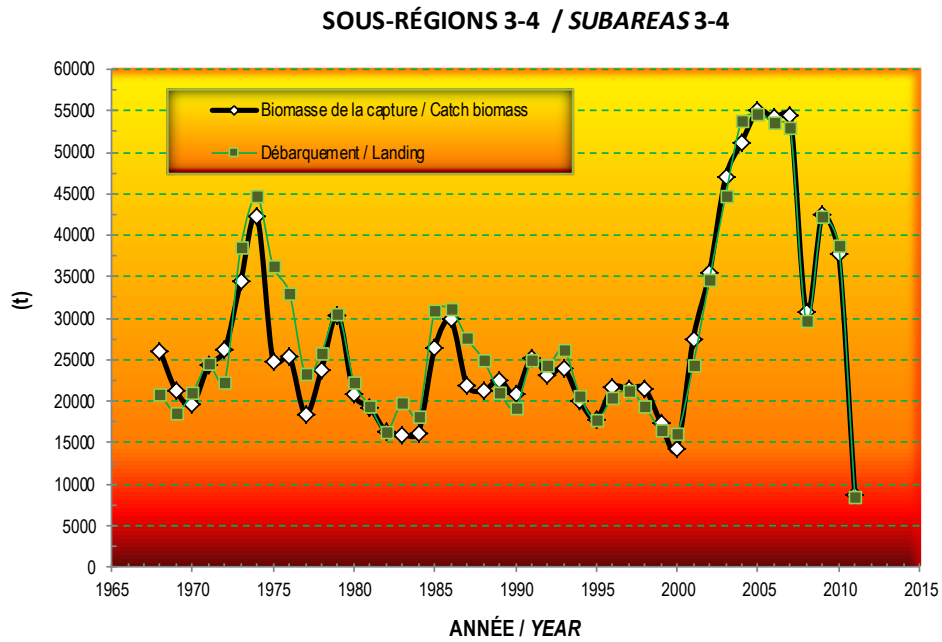


Figure 46. Landing (t) and catch biomass (t) of Atlantic mackerel in NAFO Subareas 3-4 since 1968.

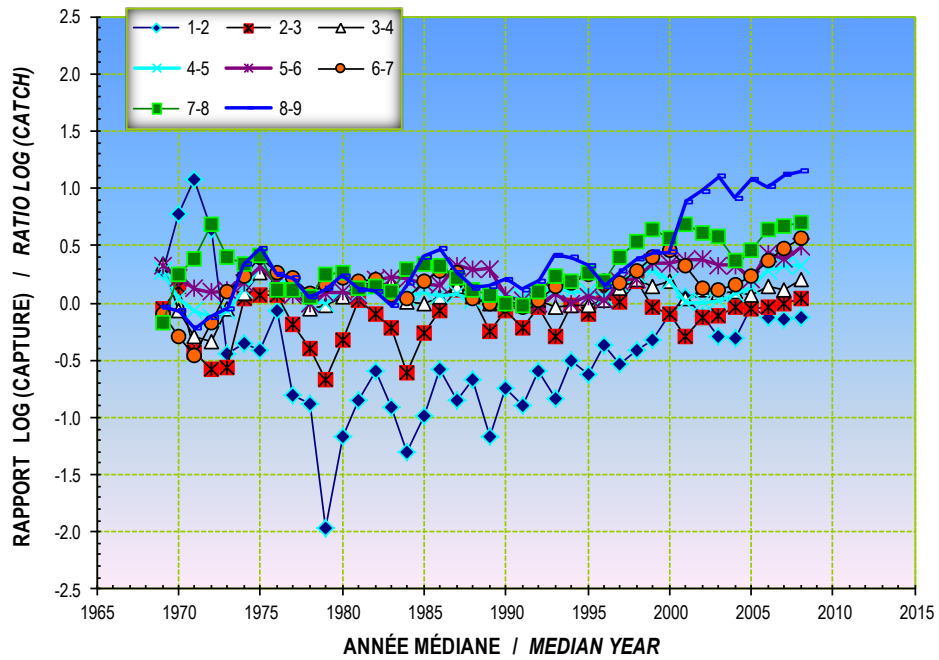


Figure 47. Ratio of the log of the catch at age (moving average of three years) of the Atlantic mackerel of NAFO Subareas 3-4.

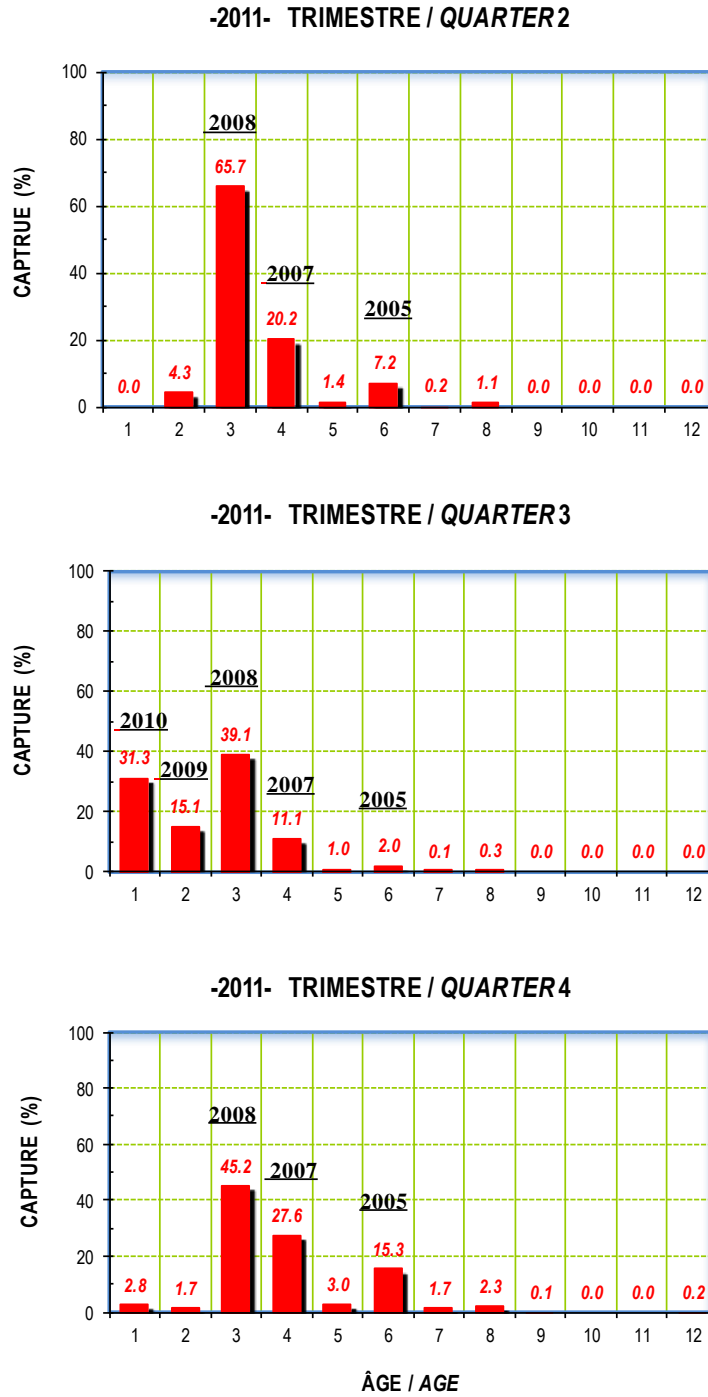
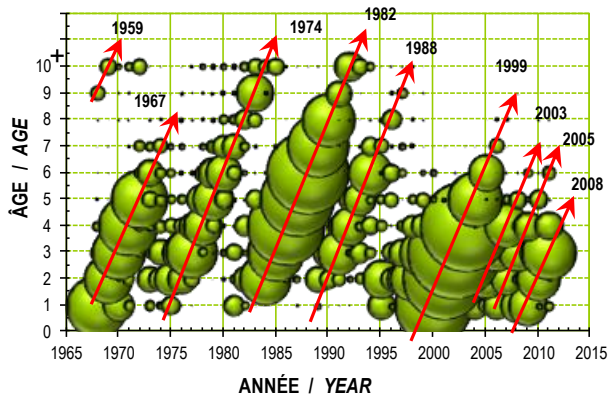
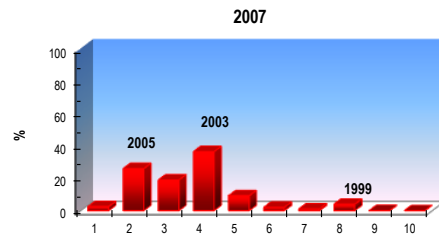
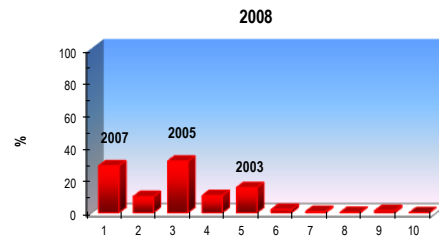
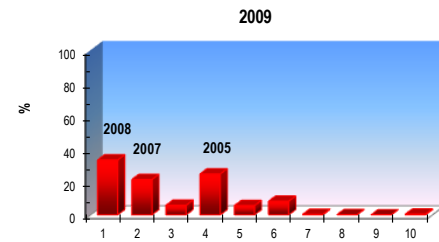
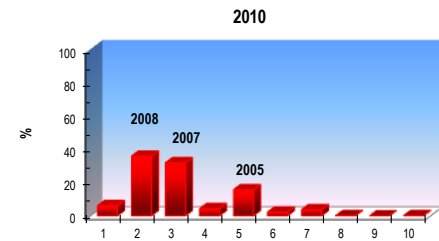
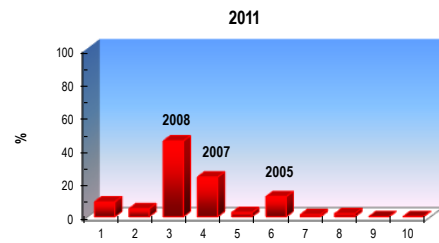


Figure 48. Atlantic mackerel catch at age (%) by quarter of NAFO Subareas 3-4 in 2011 (the most important year-classes are indicated).

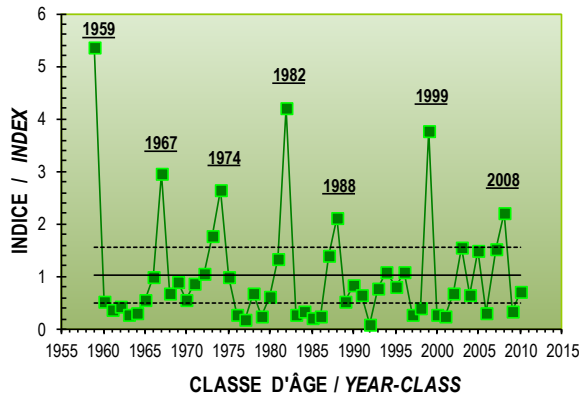
A)



B)



C)



D)

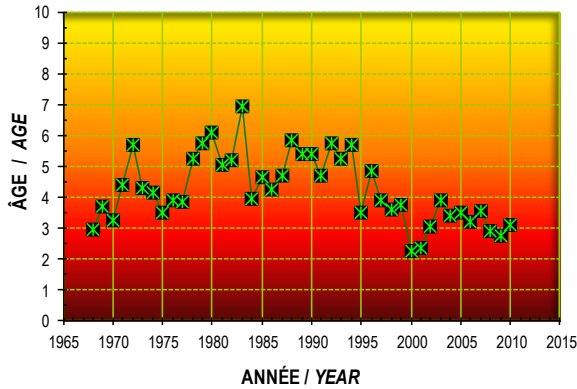


Figure 49. Catch at age in % (A and B) (dominant year-classes are indicated), Johnson's index showing the relative strength of the year-classes (horizontal lines represent the average of the 1959-2010 year-classes  $\pm 0.5$  standard deviation) (C) and mean age of the catch (D) of the Atlantic mackerel in NAFO Subareas 3-4.



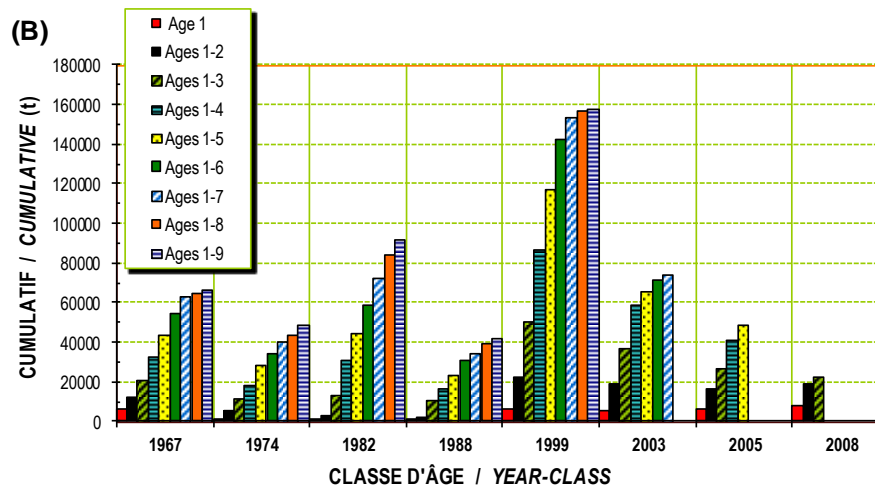
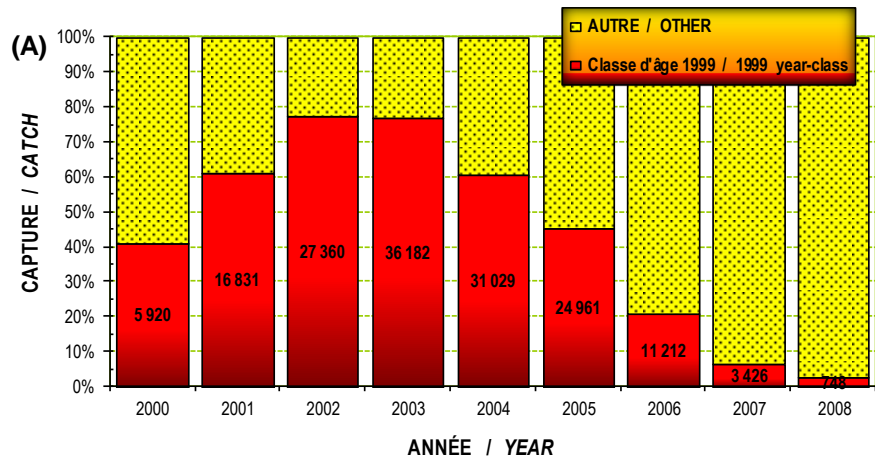


Figure 50. Atlantic mackerel catches (t) of the 1999 year-class (ages 1-9) (A) and cumulative catches (t) at age for the year-classes that have dominated the fishery since the end of the 1960s (B).

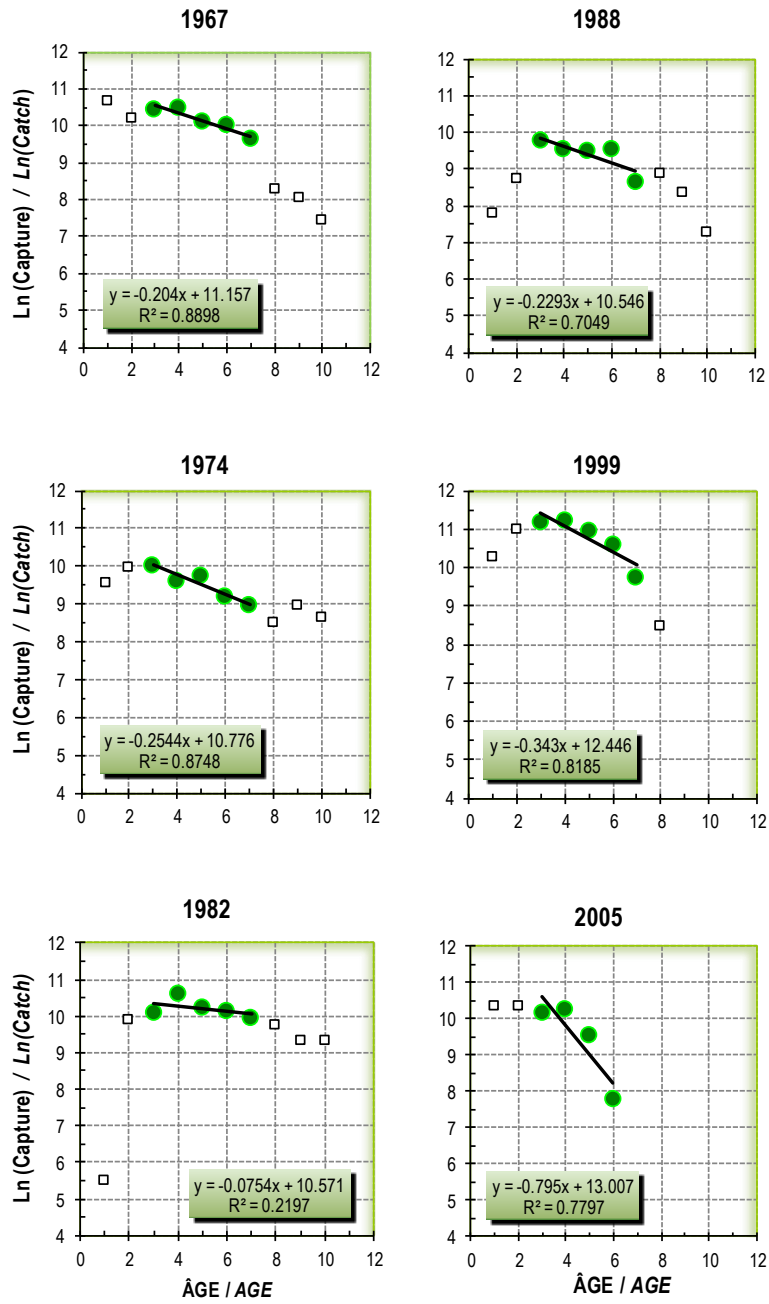


Figure 51. Catches at age curves of the year-classes that have dominated the Atlantic mackerel fishery in NAFO Subareas 3-4 since the end of the 1960s.

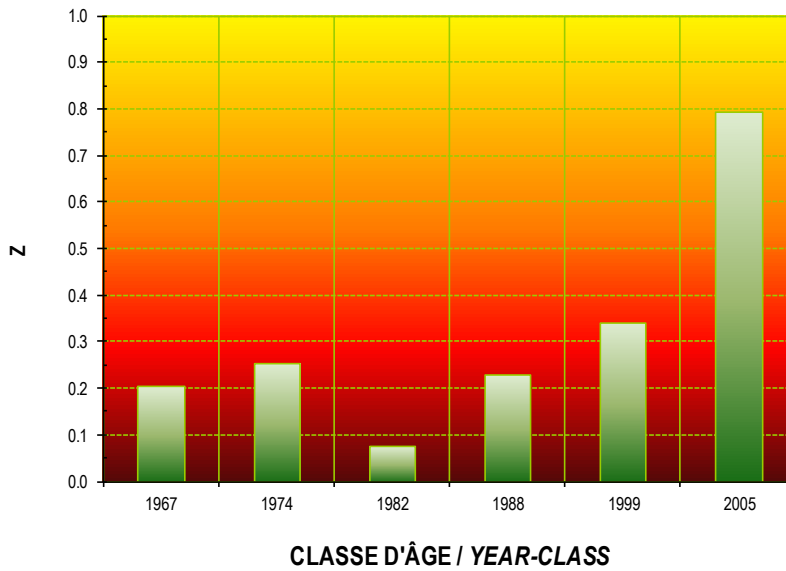


Figure 52. Instantaneous rates of total mortality ( $Z$ ) calculated according to the catch curves method for the year-classes that have dominated the Atlantic mackerel fishery in NAFO Subareas 3-4 since the end of the 1960s.

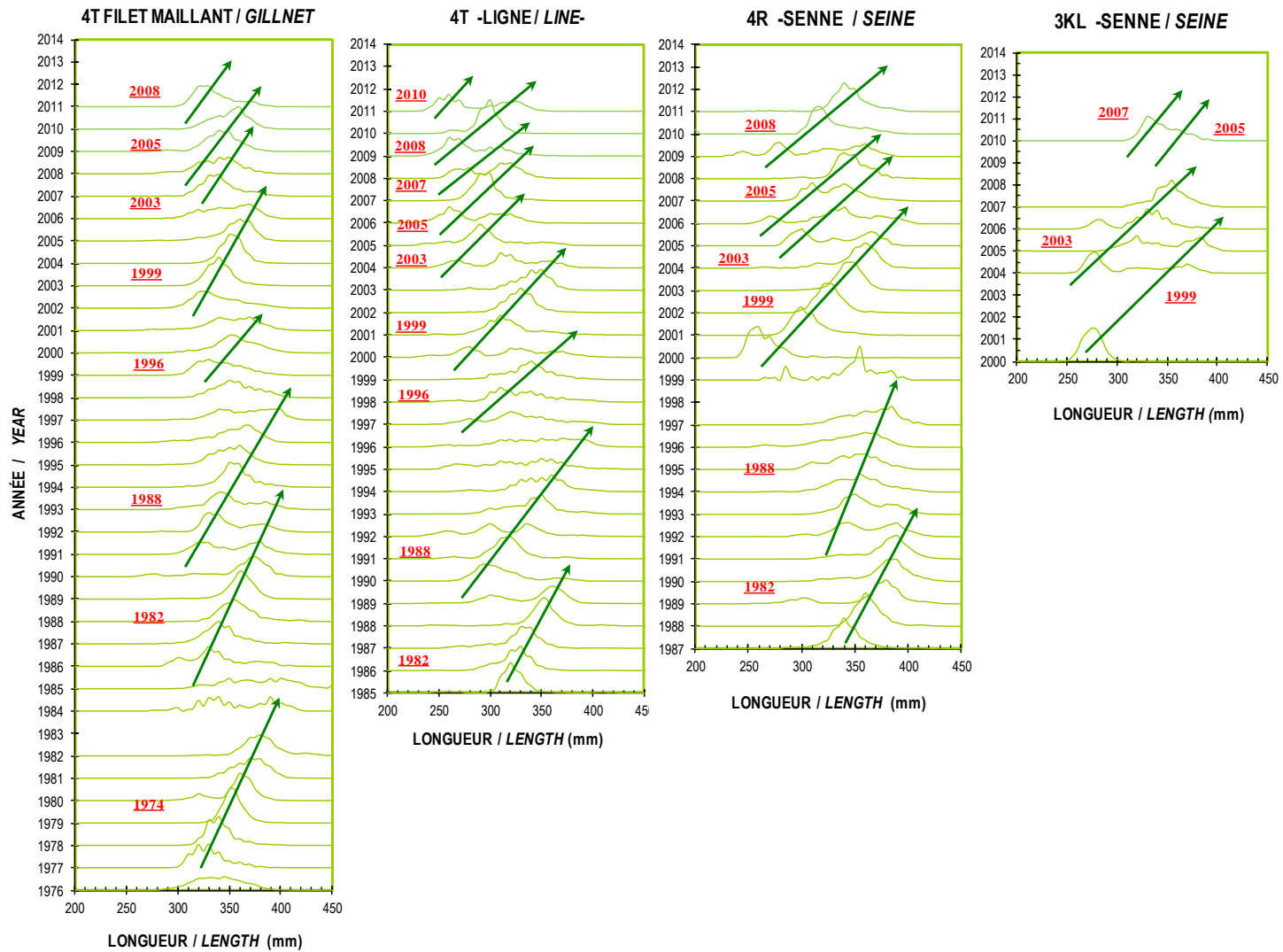


Figure 53. Annual length (mm) frequencies of Atlantic mackerel caught with gillnets and lines in Division 4T and with seine in Divisions 4R and 3KL (the year-classes that have dominated these fisheries are indicated).

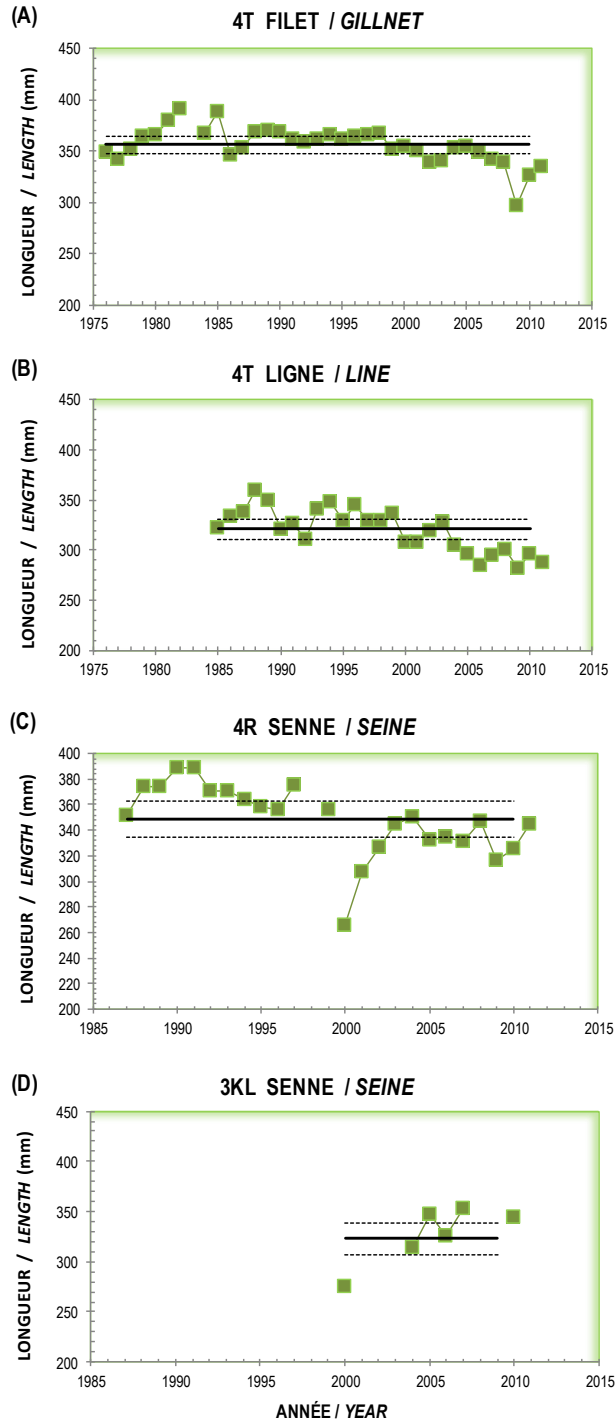


Figure 54. Annual mean length (mm) of Atlantic mackerel caught with gillnets (A) and line (B) in Division 4T and with seine in Divisions 4R (C) and 3KL (D) (horizontal lines represent the averages  $\pm$  0.5 standard deviations).

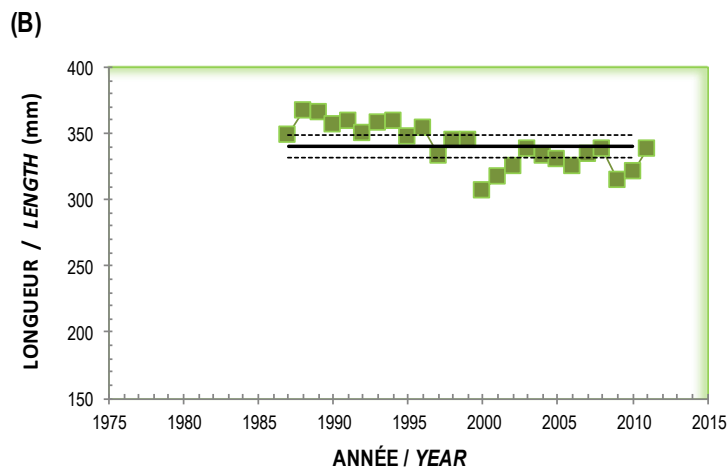
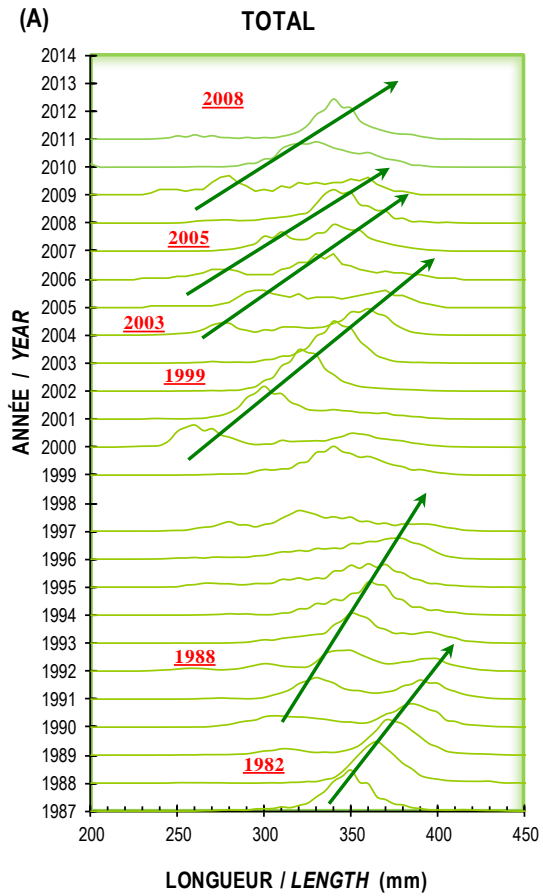


Figure 55. Annual length (mm) frequencies (A) and annual mean length (mm) (B) of the Atlantic mackerel caught in NAFO Divisions 4R, 4T, and 3KL since 1987 (horizontal lines in B represent the average  $\pm$  0.5 standard deviation).

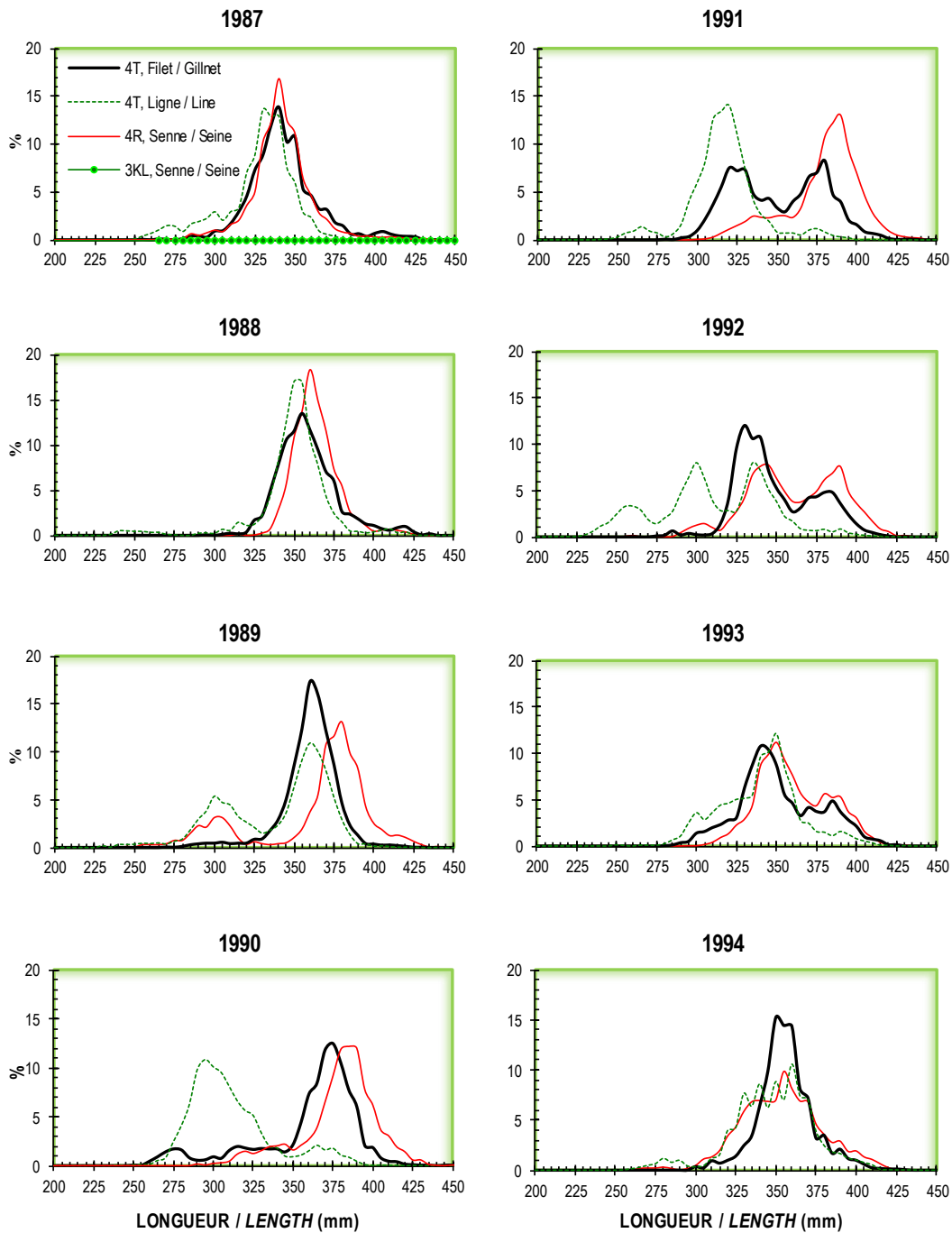


Figure 56. Length (mm) frequencies (%) of the Atlantic mackerel catches made with gillnet, line, and seine in NAFO Divisions 4R, 4T, and 3KL since 1987.

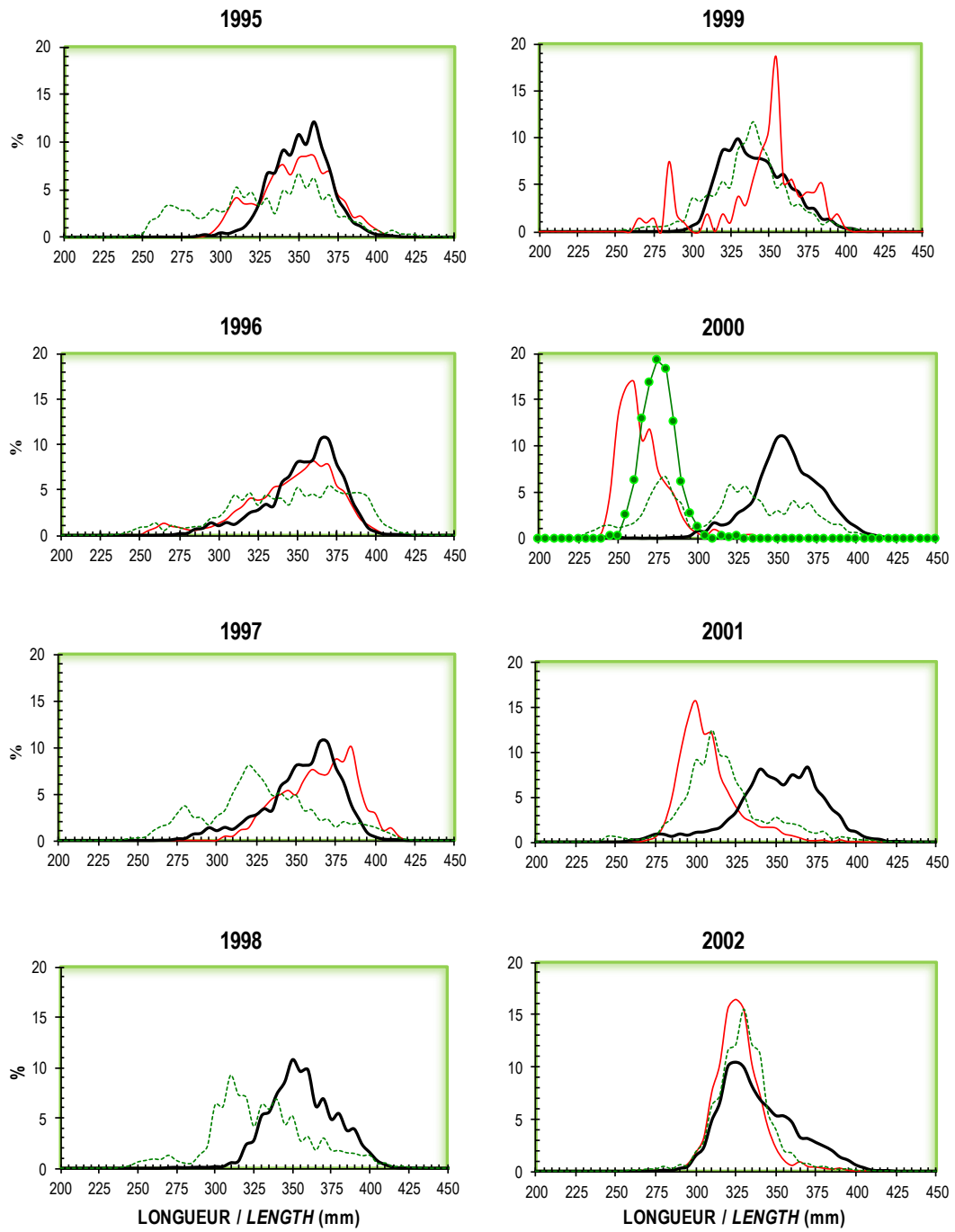


Figure 56. (Continued).



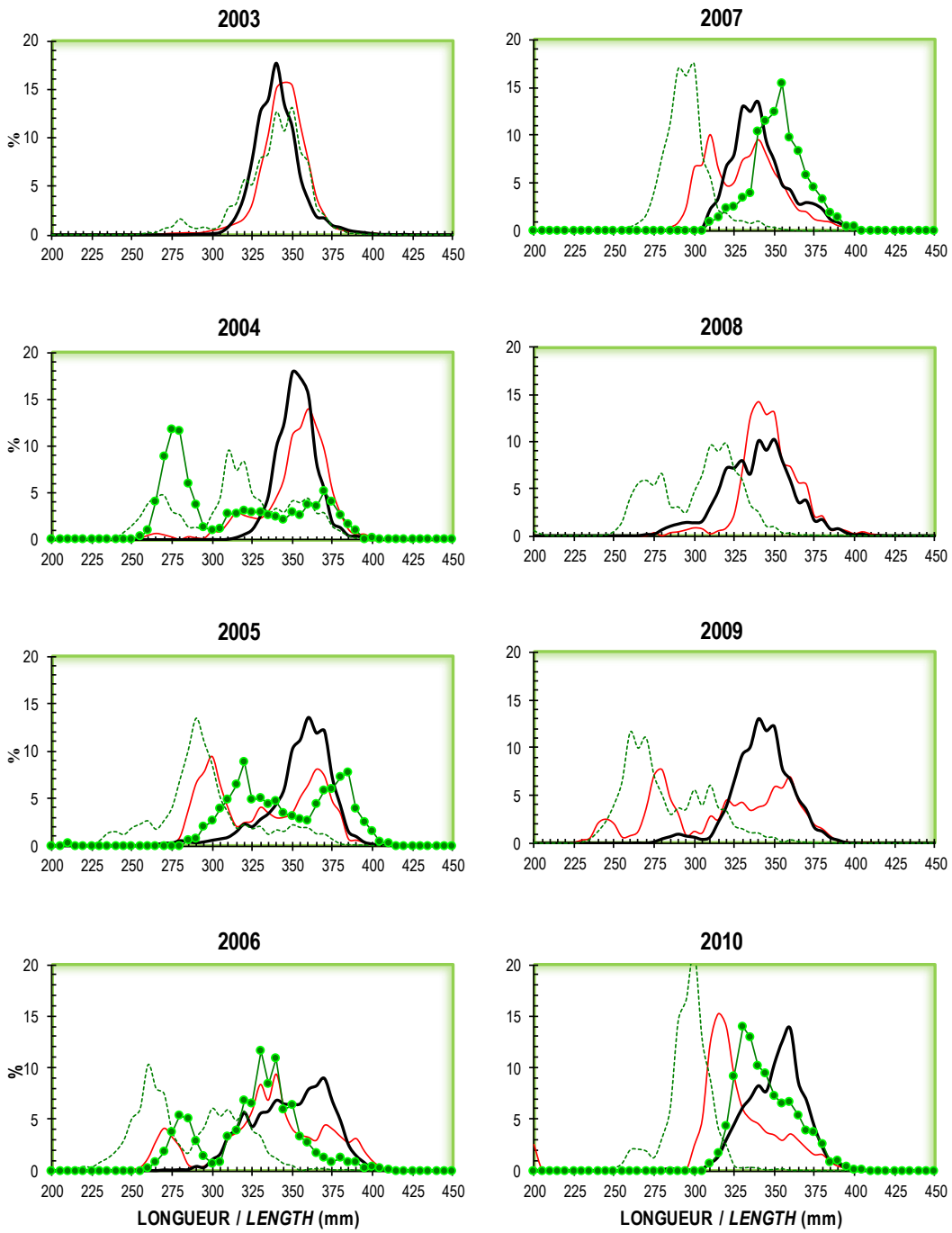


Figure 56. (Continued).

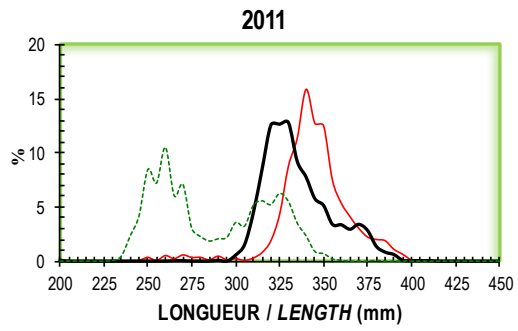


Figure 56. (Continued).

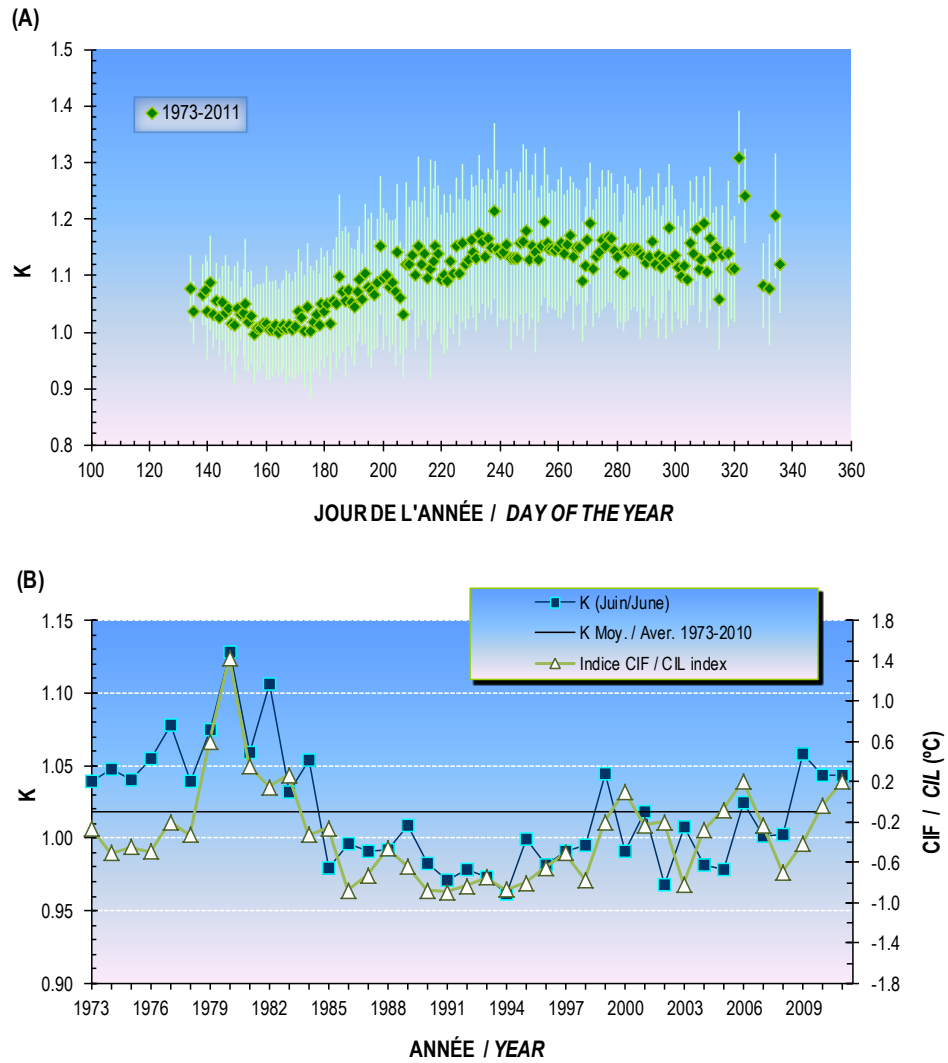


Figure 57. Mean daily values of the Fulton condition factor ( $K$ ) (with standard deviations) for the 1973-2011 period (A) and annual condition factor calculated in June with the cold intermediate, or CIL, temperature index (B).

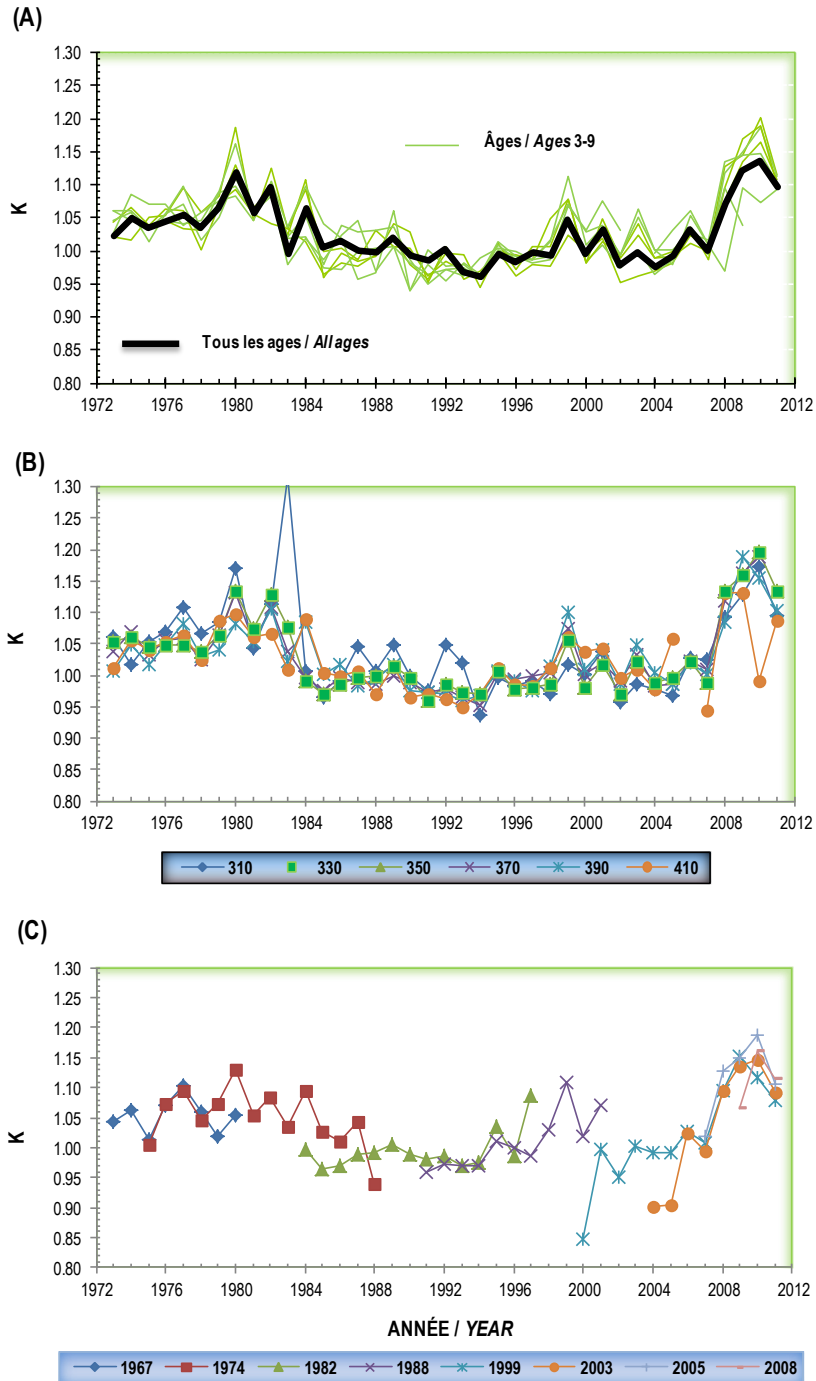


Figure 58. Mean Fulton condition factor ( $K$ ) calculated in June by age group (A), length class (mm) (B), and year-class (C).

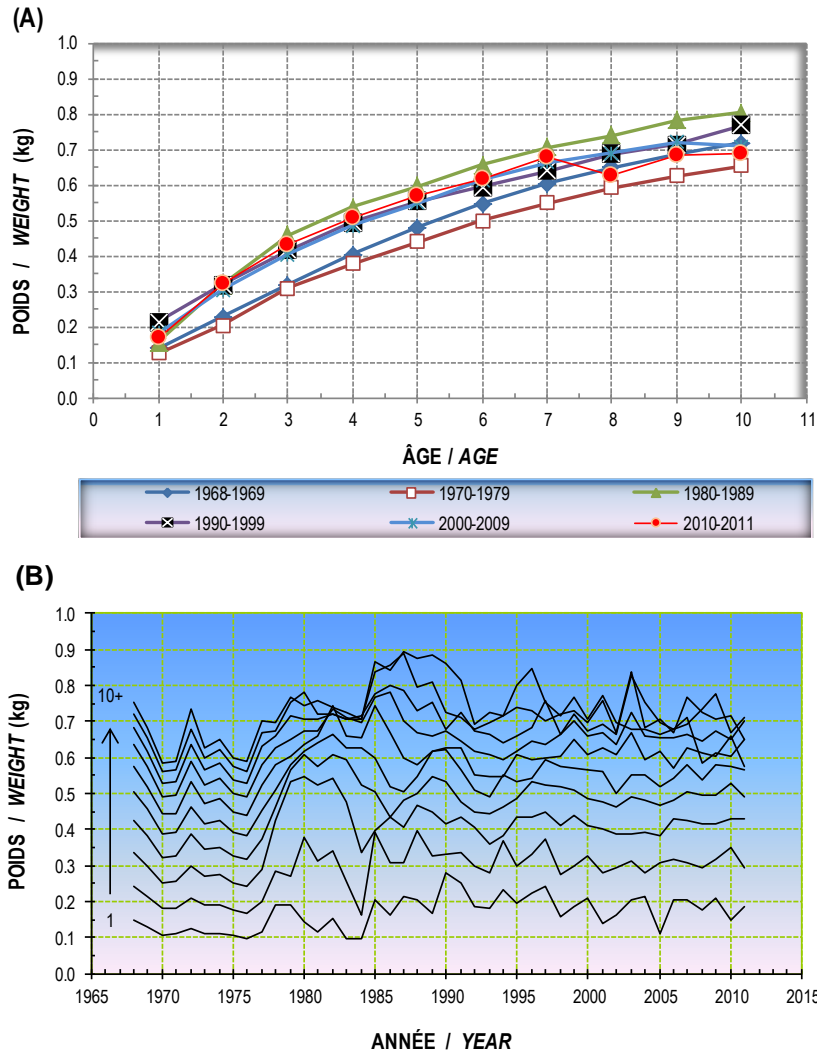


Figure 59. Mean weight (kg) at age by period of years (A) and annual weight (kg) at ages 1-10<sup>+</sup> (B) of the Atlantic mackerel in NAFO Subareas 3-4 since 1968.

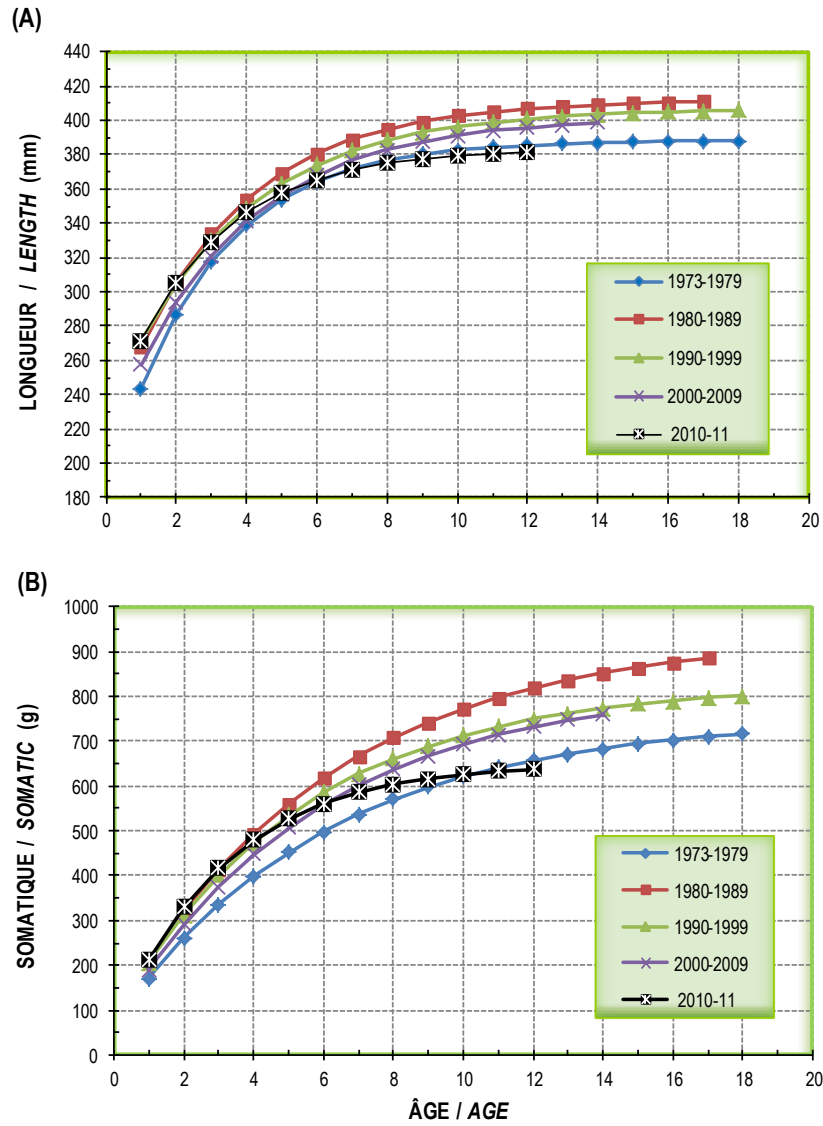


Figure 60. Von Bertalanffy growth curves for length (mm) (A) and somatic weight (g) (B) calculated by period of years for the Atlantic mackerel in NAFO Subareas 3-4 since 1973.

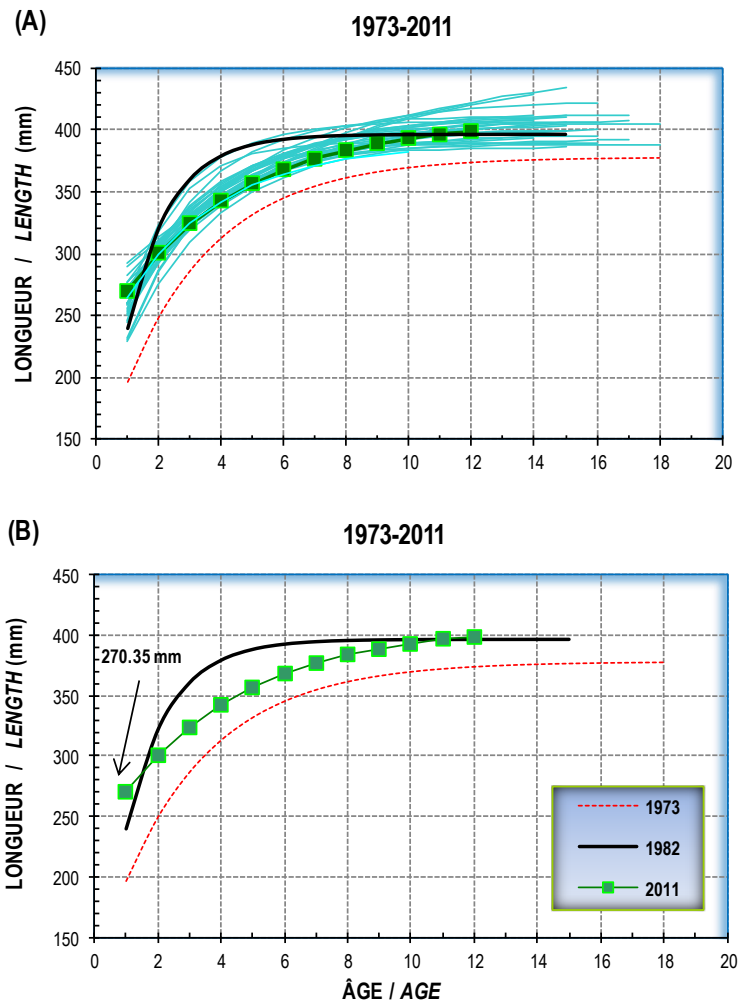


Figure 61. Von Bertalanffy growth curves for length (mm) (A et B) and somatic weight (g) (C and D) of the Atlantic mackerel in NAFO Subareas 3-4 since 1973. The fastest and slowest growth years are indicated.

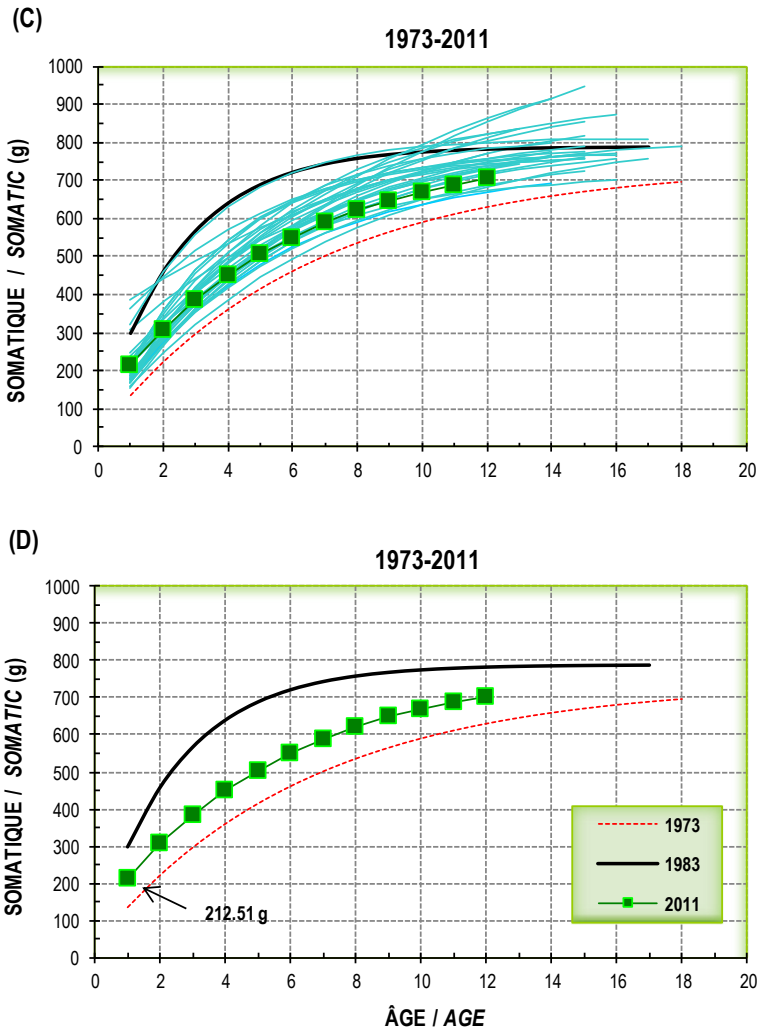


Figure 61. (Continued).



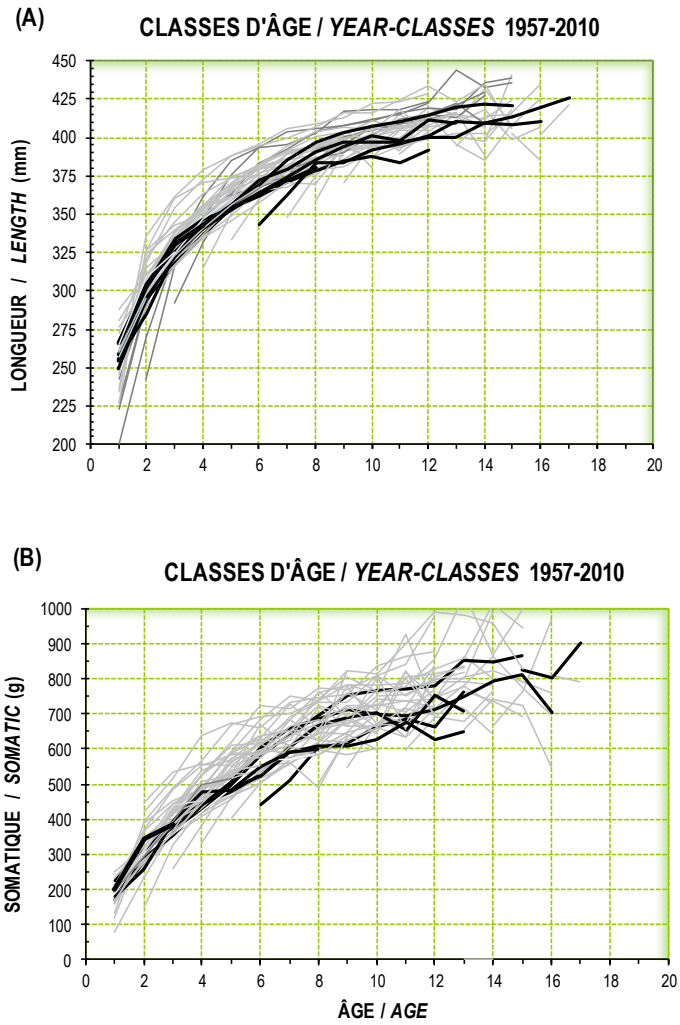


Figure 62. Mean length (mm) (A) and somatic weight (g) (B) at age of the Atlantic mackerel year-classes that were sampled in NAFO Subareas 3-4 since 1973 (the year-classes that have dominated the fishery are indicated by the bold lines).

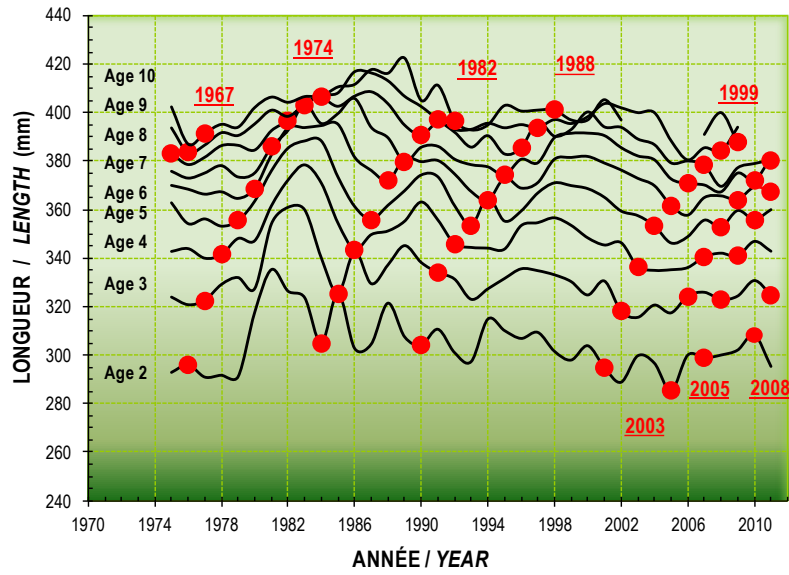


Figure 63. Mean length (mm) calculated by age group for the Atlantic mackerel sampled in NAFO Subareas 3-4 since 1973 (the ages are indicated as are the year-classes that have dominated the fishery).

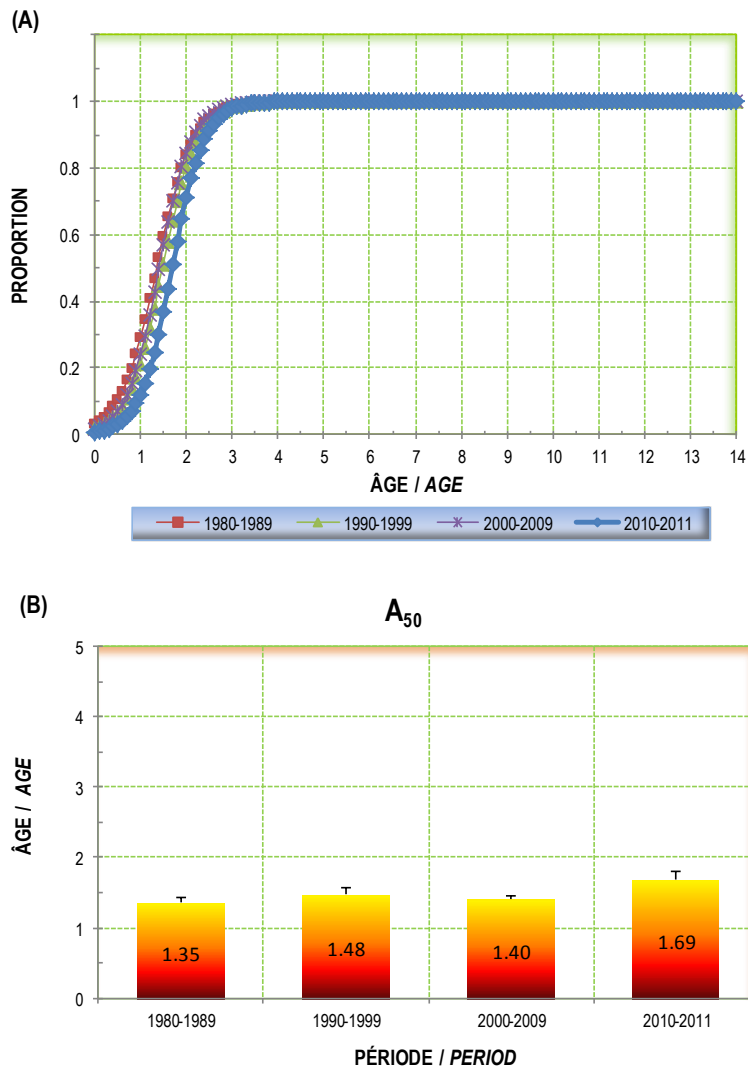


Figure 64. Proportion of maturity at age by period of years (A) and median age  $A_{50}$  (B) (with confidence intervals at 95%) of the Atlantic mackerel sampled in June in NAFO Subareas 3-4 since 1980.

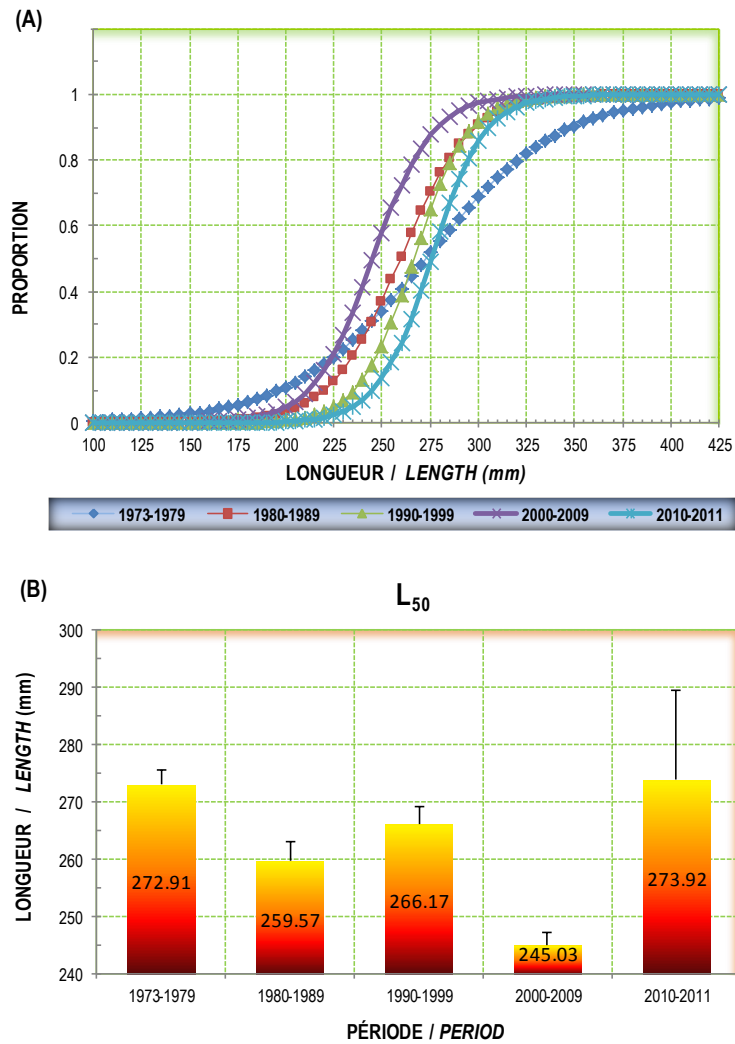


Figure 65. Proportion of maturity at length by period of years (A) and median length  $L_{50}$  (B) (with confidence intervals at 95%) of the Atlantic mackerel sampled in June in NAFO Subareas 3-4 since 1973.

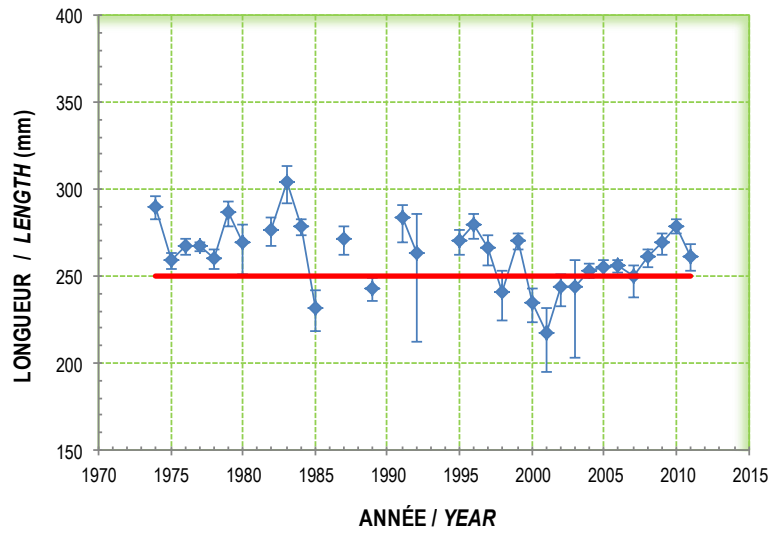


Figure 66. Median length  $L_{50}$  of the Atlantic mackerel in NAFO Subareas 3-4 since 1973 (the horizontal line represents the minimum legal size of 250 mm is indicated).

**APPENDIX 1.**  
**Species Codes Used by the Nova Scotia Observers.**

CODE	NOM	NAME	SCIENTIFIQUE / SCIENTIFIC
10	Morue	Cod	<i>Gadus morhua</i>
11	Aiglefin	Haddock	<i>Melanogrammus aeglefinus</i>
12	Merluce blanche	White hake	<i>Urophycis tenuis</i>
13	Merluce-écureuil	Red hake	<i>Urophycis chuss</i>
14	Merlu argenté	Silver hake	<i>Merluccius bilinearis</i>
16	Goberge	Pollock	<i>Pollochius virens</i>
23	Sébaste	Redfish	<i>Sebastes spp.</i>
30	Flétan atlantique	Atlantic halibut	<i>Hippoglossus hippoglossus</i>
42	Limande à queue jaune	Yellowtail flounder	<i>Limanda ferruginea</i>
43	Plie rouge	Winter flounder	<i>Pseudopleuronectes americanus</i>
49	Poisson plat	Flatfish	Pleuronectidae
60	Hareng	Herring	<i>Clupea harengus</i>
70	Maquereau bleu	Atlantic mackerel	<i>Scomber scombrus</i>
71	Thon rouge	Bluefin tuna	<i>Thunnus thynnus</i>
211	Raies	Skates	Rajidae
220	Aiguillat commun	Spiny dogfish	<i>Aqualus acanthias</i>
400	Baudroie	Monkfish	<i>Lophius americanus</i>
2211	Crevette nordique	Shrimp	<i>Pandalus borealis</i>
2550	Homard	American lobster	<i>Homarus americanus</i>
4511	Calmar courtes nageoires	Short-fin squid	<i>Illex illecebrosus</i>
7001	Morue, goberge, aiglefin	Cod, pollock, haddock	
7099	Autres	Other	
6600	Concombres de mer	Sea cucumbers	Holothuroidea
7011	Échantillonnage écosystème	Ecosystem sampling	
NK	Inconnu	Not known	