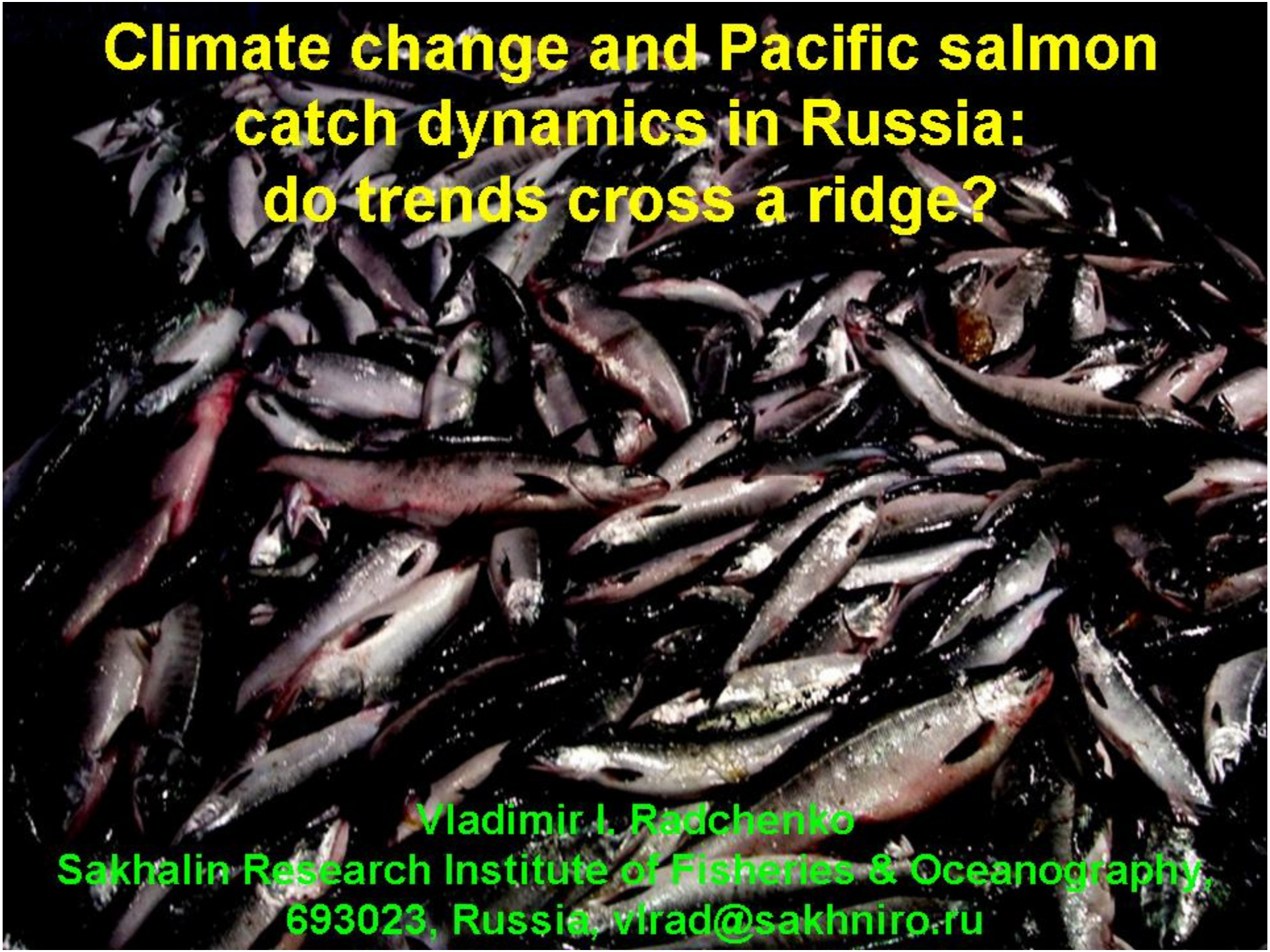
Climate change and Pacific salmon catch dynamics in Russia: do trends cross a ridge?



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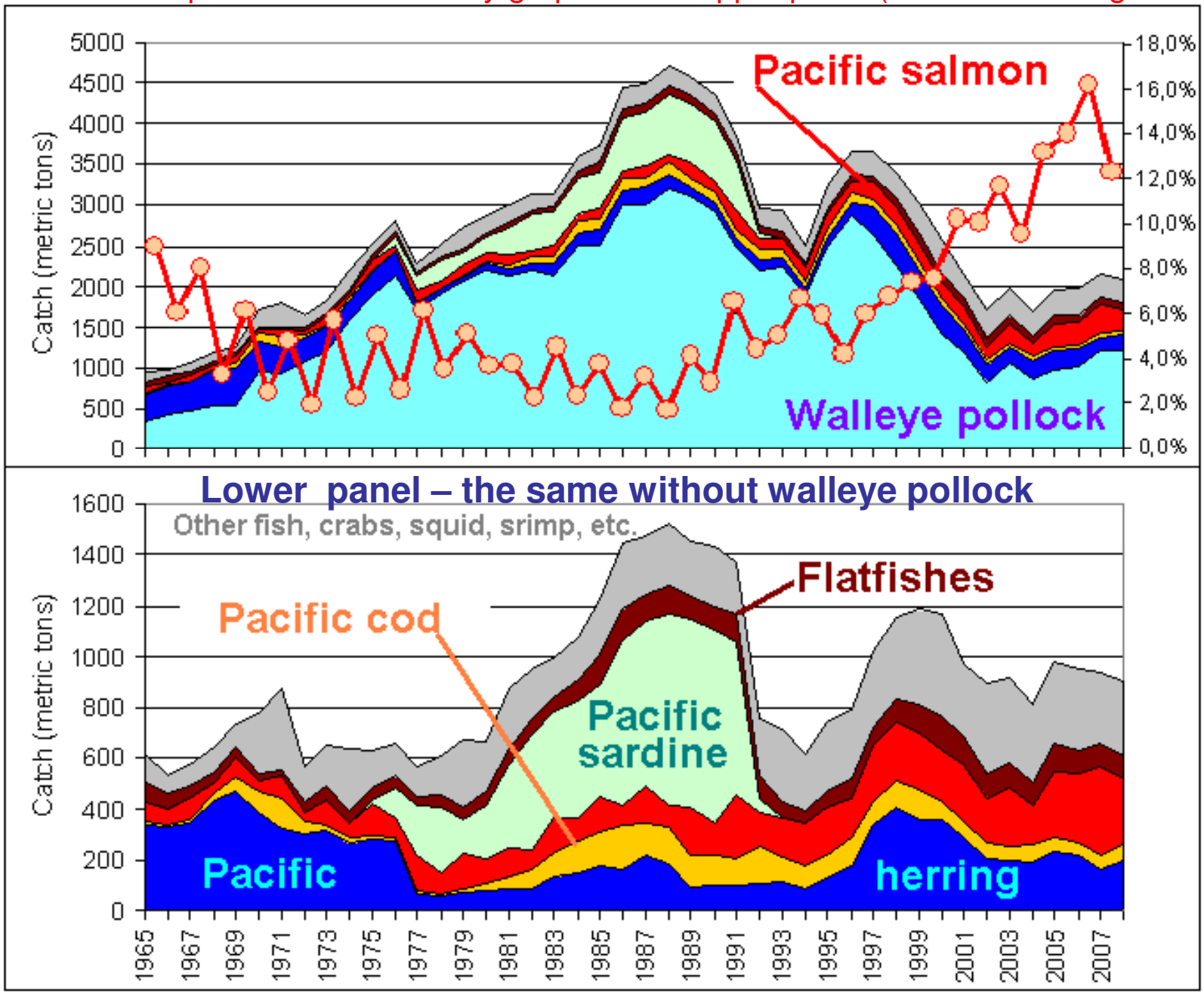
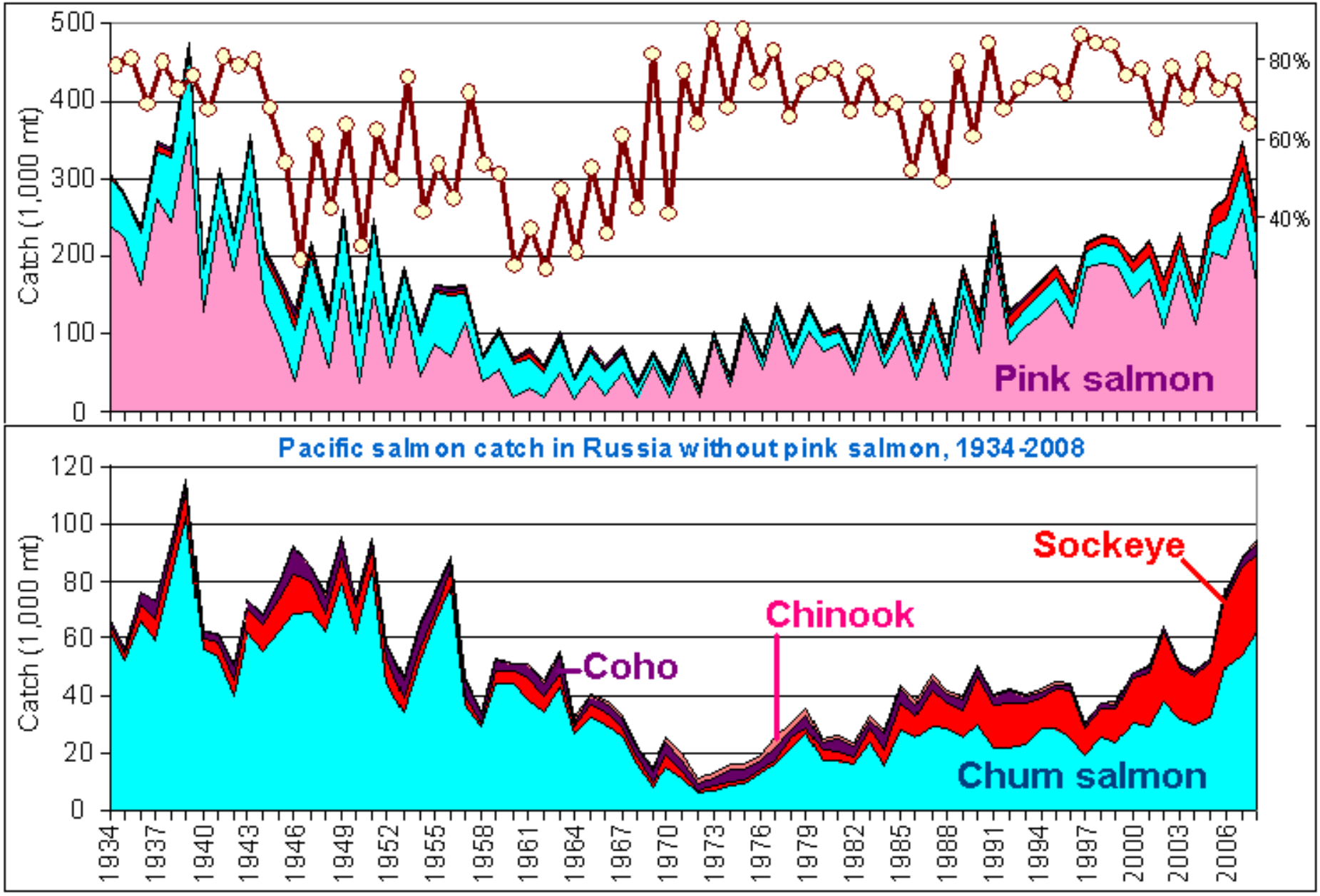
Total Russian fishery harvest in the far-eastern part of Russian EEZ, 1965-2008

Pacific salmon portion is indicated by graph on the upper panel (relative to the right axis)

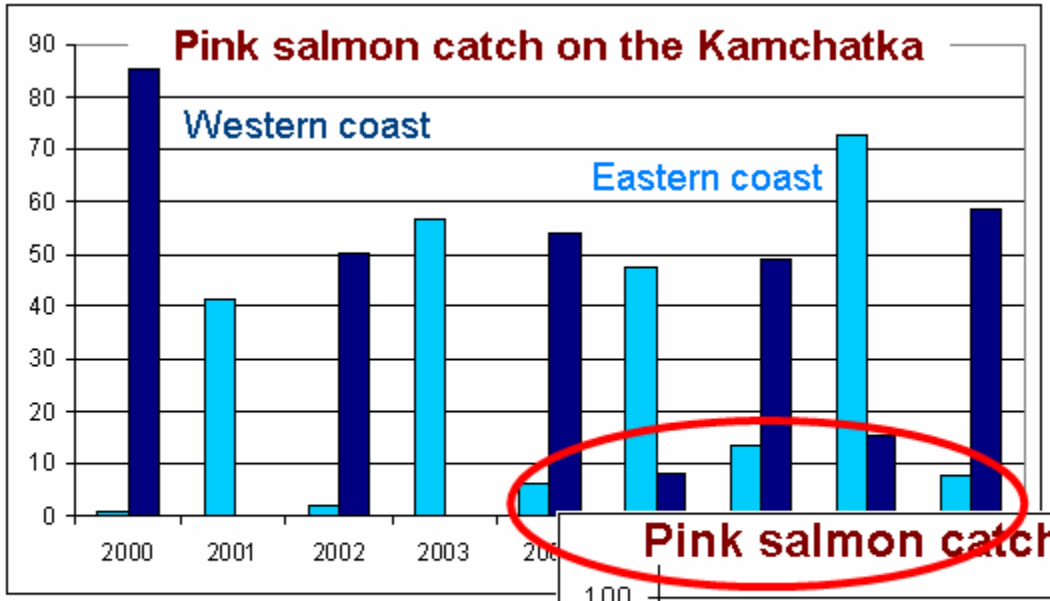


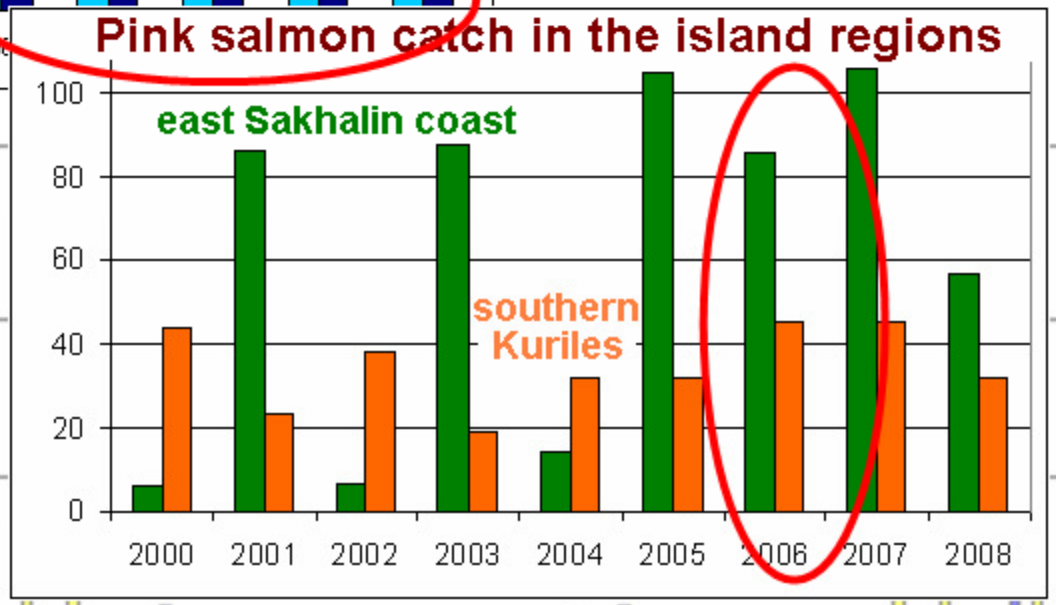
Pacific salmon catch in Russia, 1934-2008

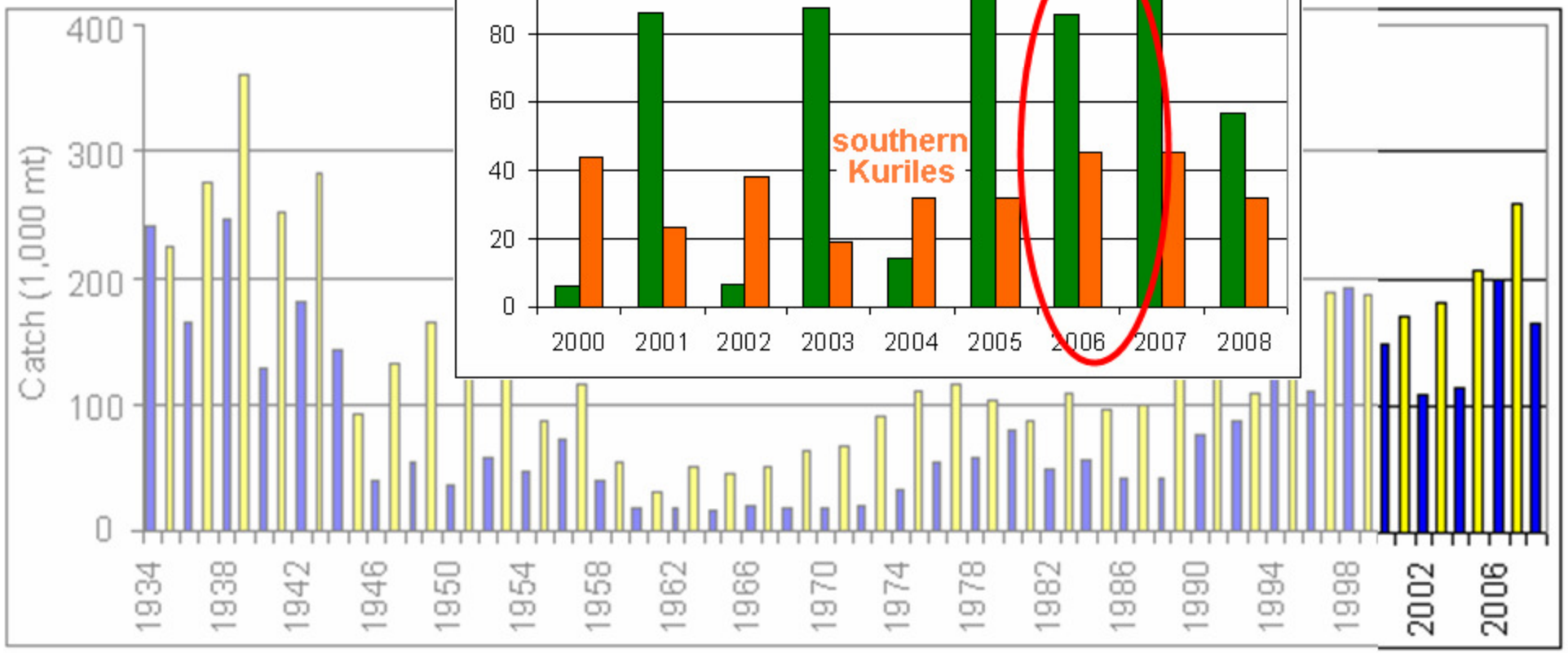
Pink salmon portion is indicated by graph on the upper panel (relative to the right axis)



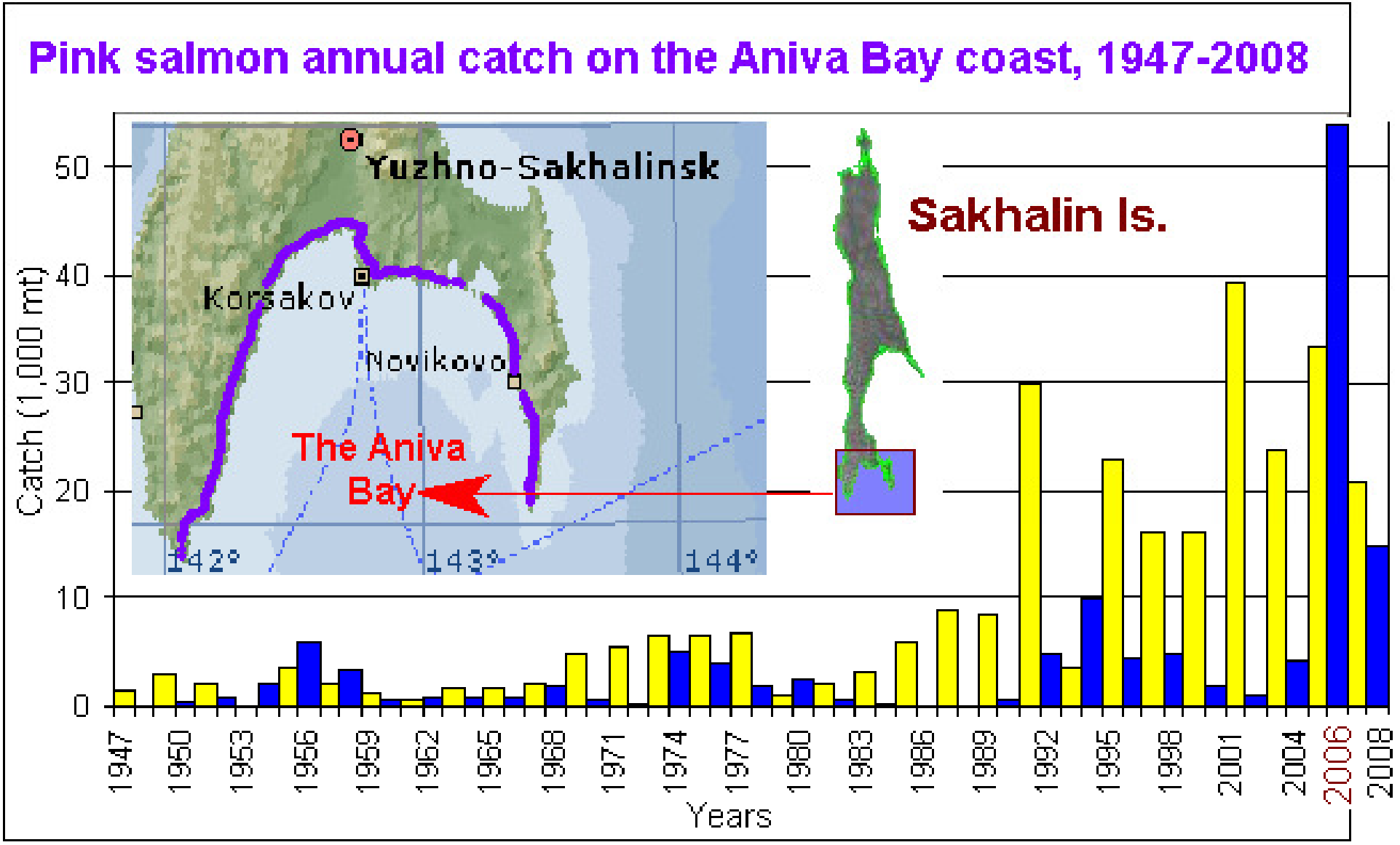
Pink salmon catch dynamics in the main fishery regions on the Russian Far East, 1934-2008, with emphasis to the present century





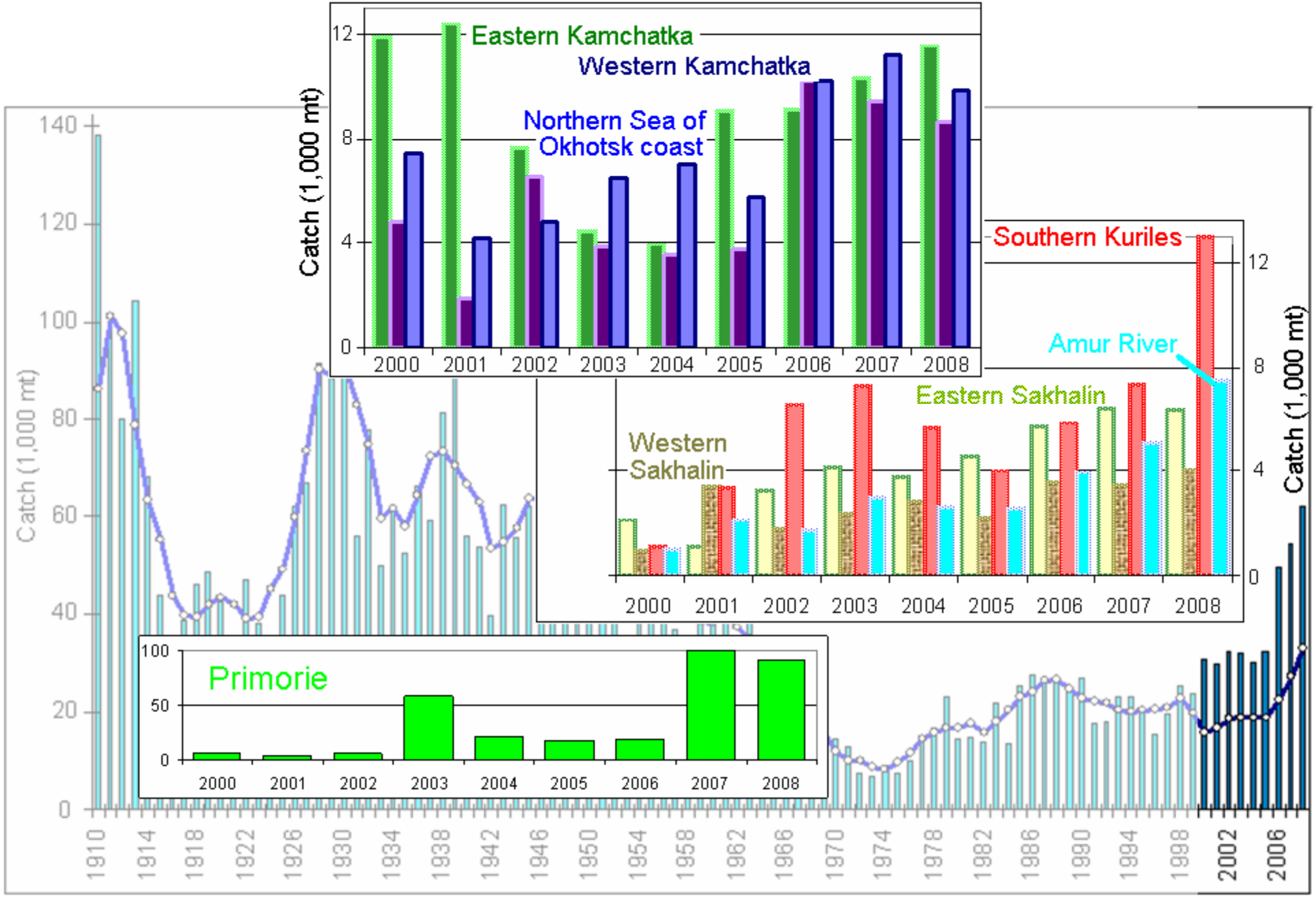


Pink salmon annual catch on the Aniva Bay coast, 1947-2008

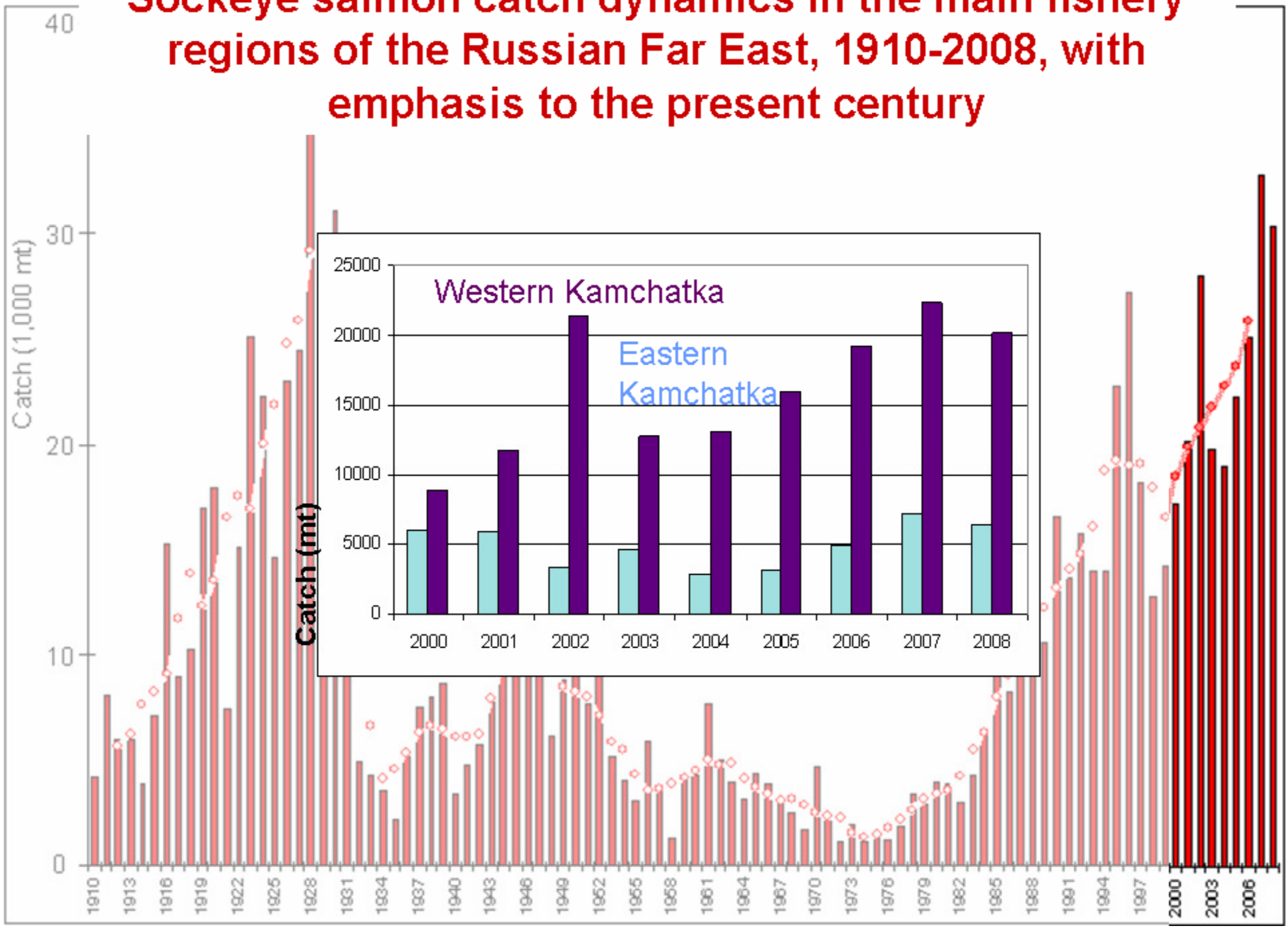


In 2006, pink salmon annual catch in the Aniva Bay exceeded the regional historical high (1994) in 5.5 times! Return rate calculated by routine manner from the total pink salmon outmigrants' abundance exceeded 20% !! (Kaev 2007)

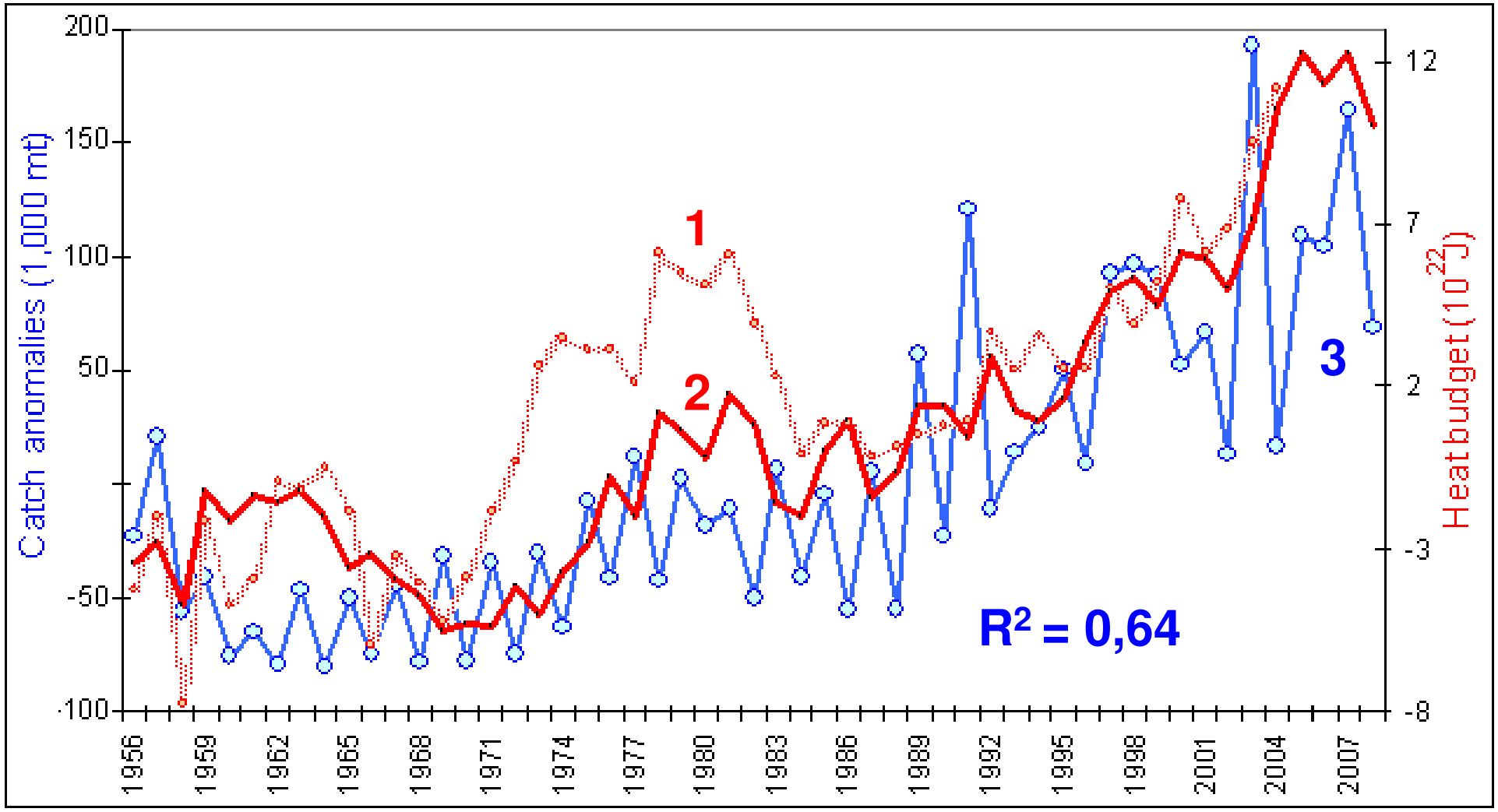
Chum salmon catch dynamics in the main fishery regions on the Russian Far East, 1934-2008, with emphasis to the present century



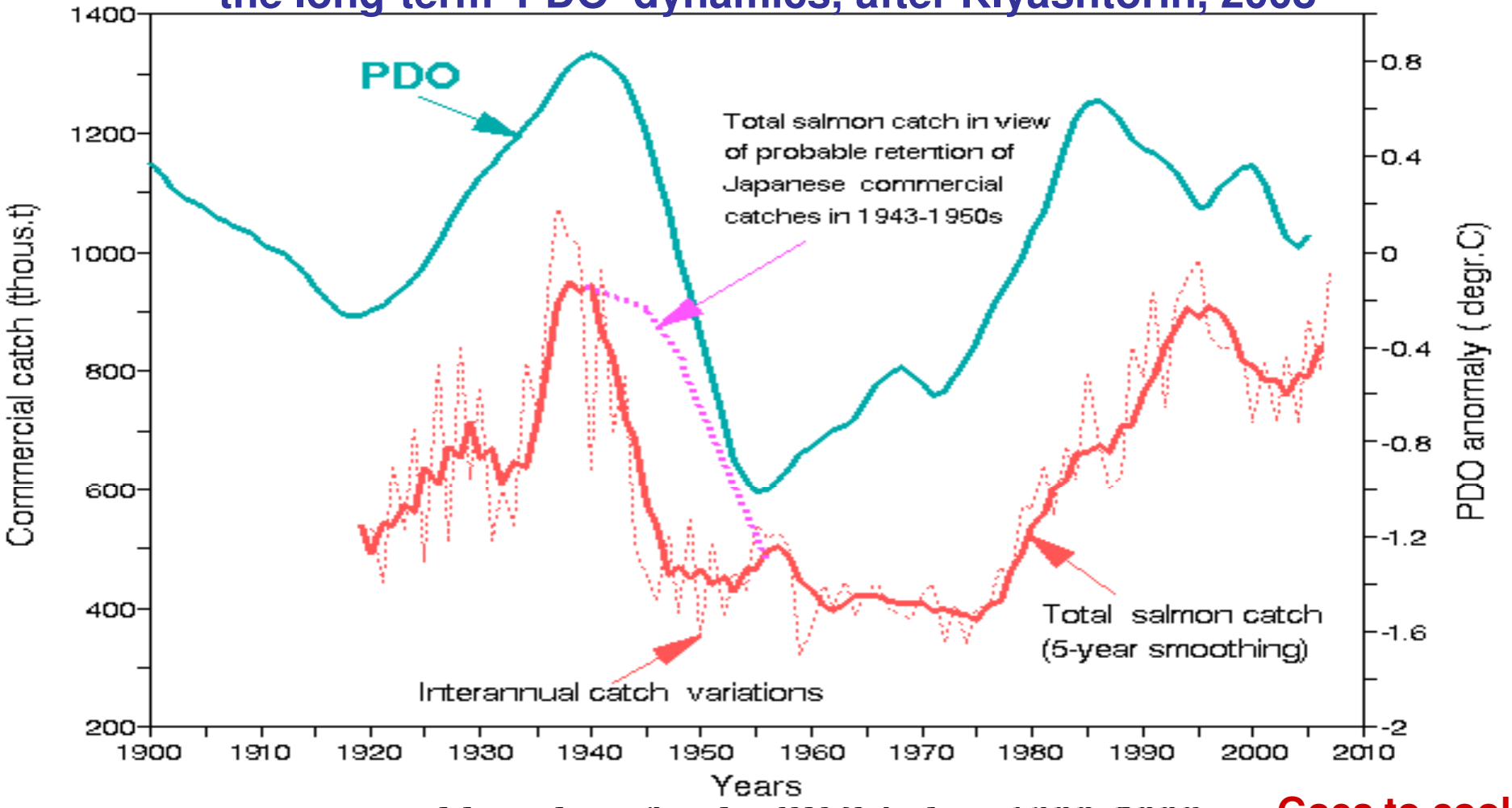
Sockeye salmon catch dynamics in the main fishery regions of the Russian Far East, 1910-2008, with emphasis to the present century

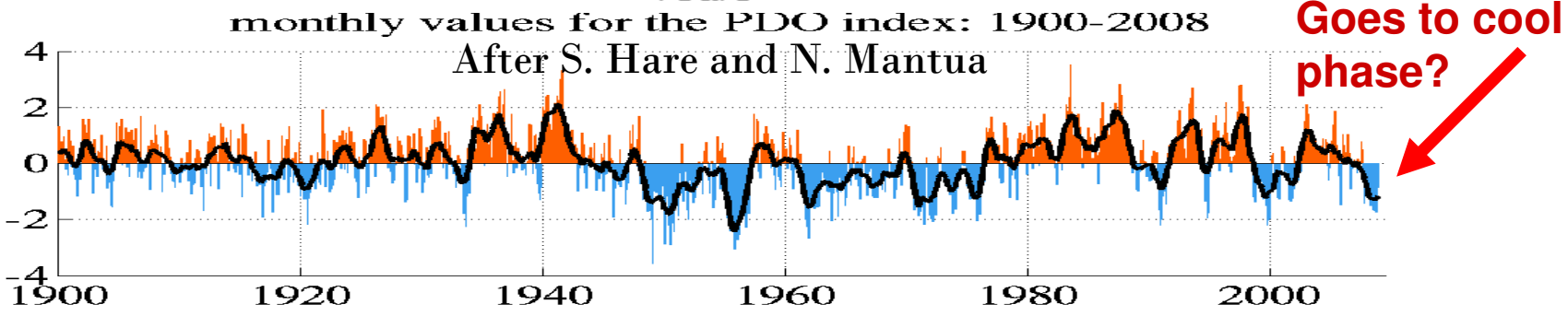


Time series of yearly ocean heat content for the 0-700 layer, (1) after Levitus et al., 2005, and revised by R. Simmon, after Lindsey, 2008 (2), and pink salmon catch on the Russian Far East coast, 1956 – 2008



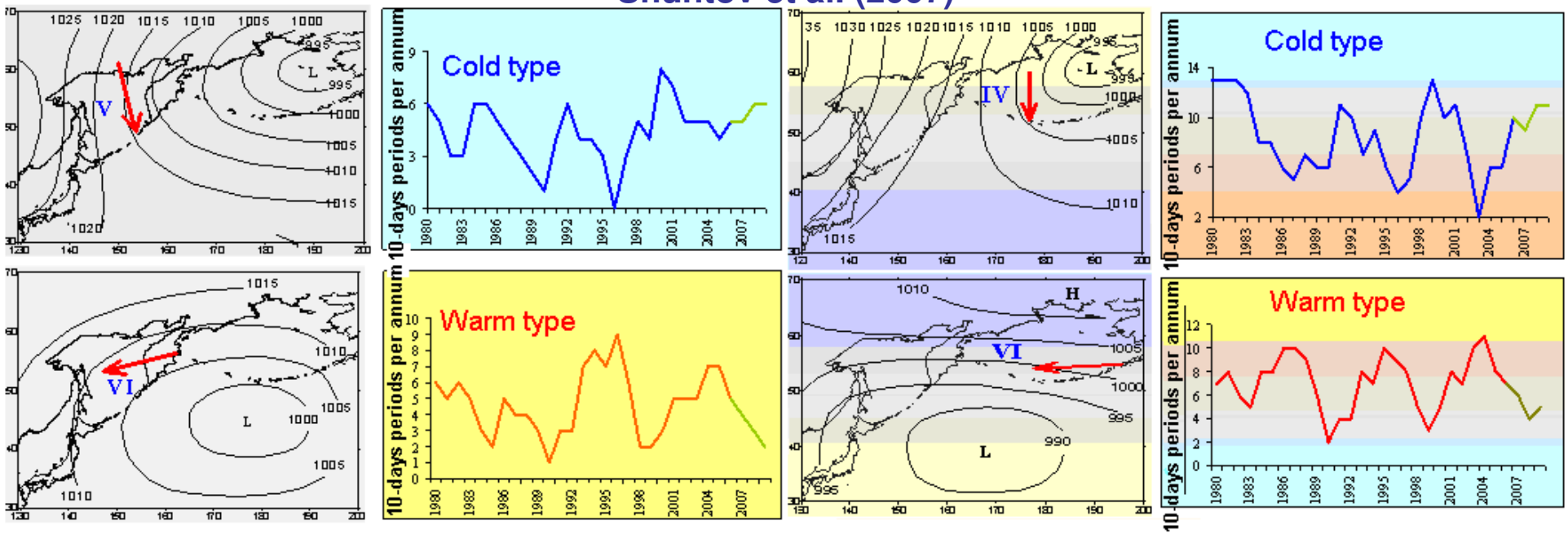
Cyclic fluctuations of Pacific salmon production in comparison with the long-term PDO dynamics, after Klyashtorin, 2008

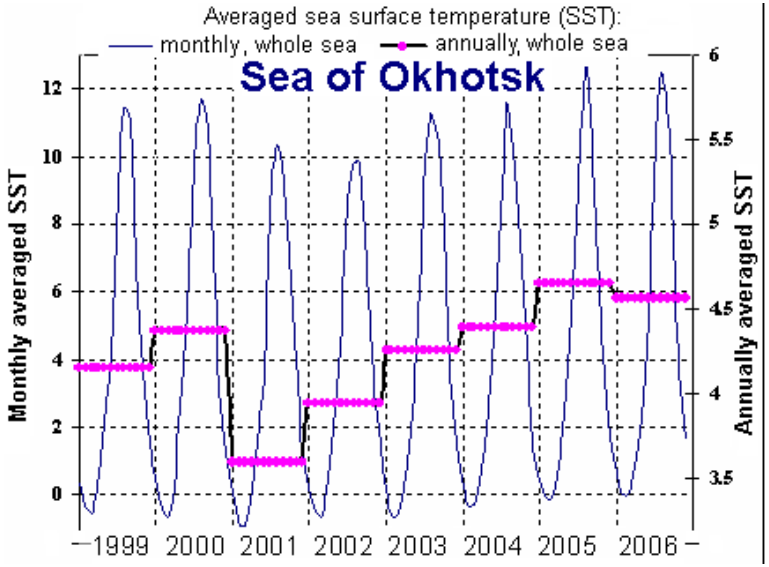




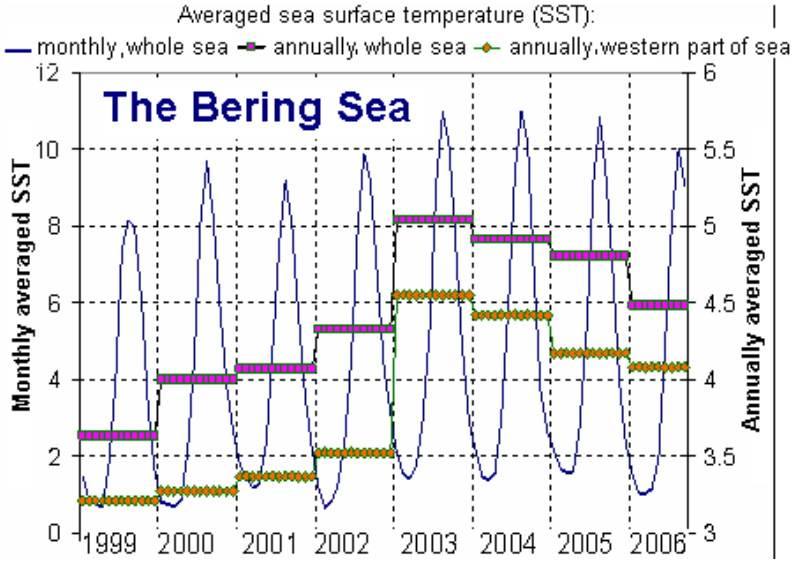
Goes to cool phase?

Synoptic situations (baric field patterns) forming "cold" and "warm" types of atmospheric processes above the Bering Sea (right panels) and Sea of Okhotsk (left panels), and interannual dynamics of their repetition frequency. After S. Glebova (2005) with additions by Shuntov et al. (2007)

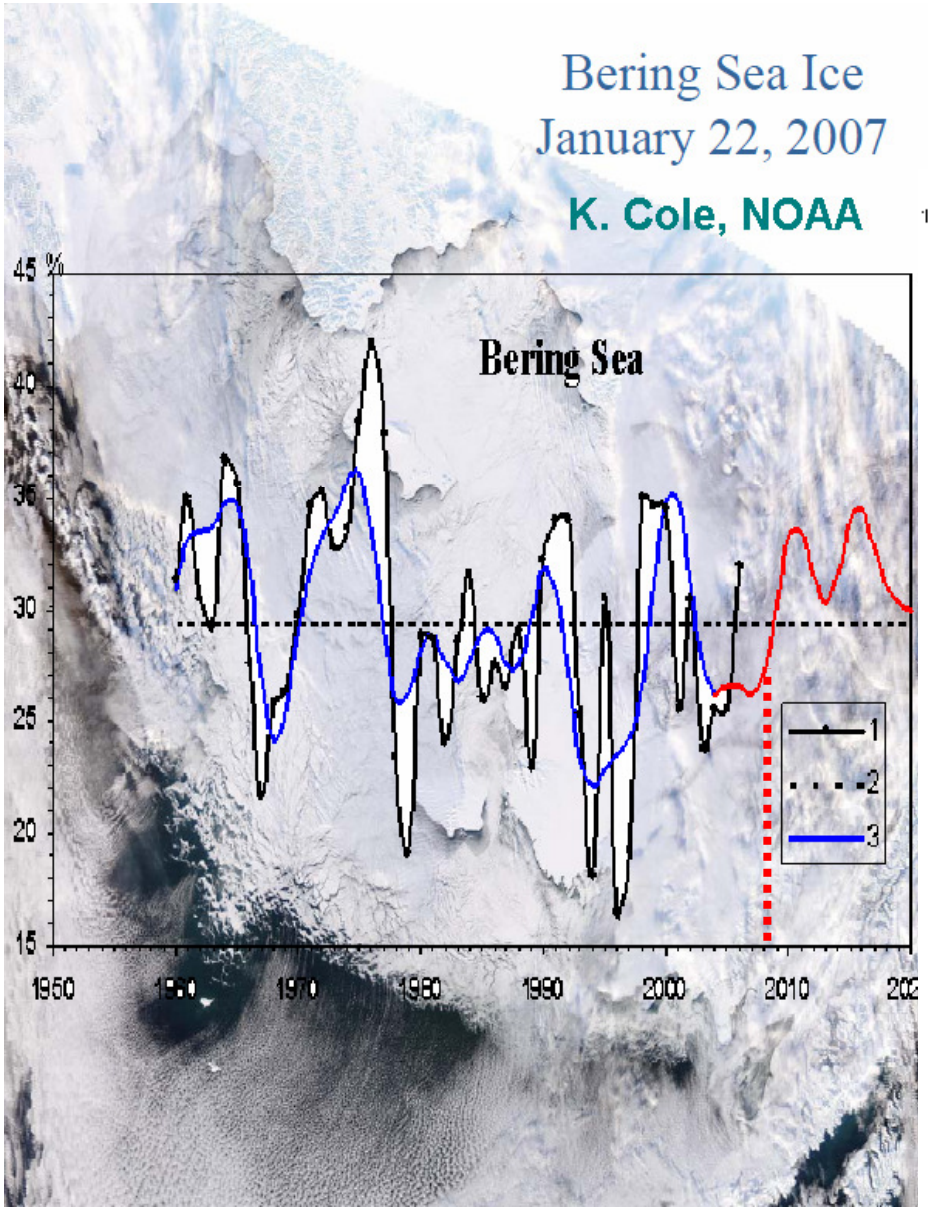




SST dynamics in the Bering and Okhotsk Seas, 1999-2006, after Khen et al., 2008

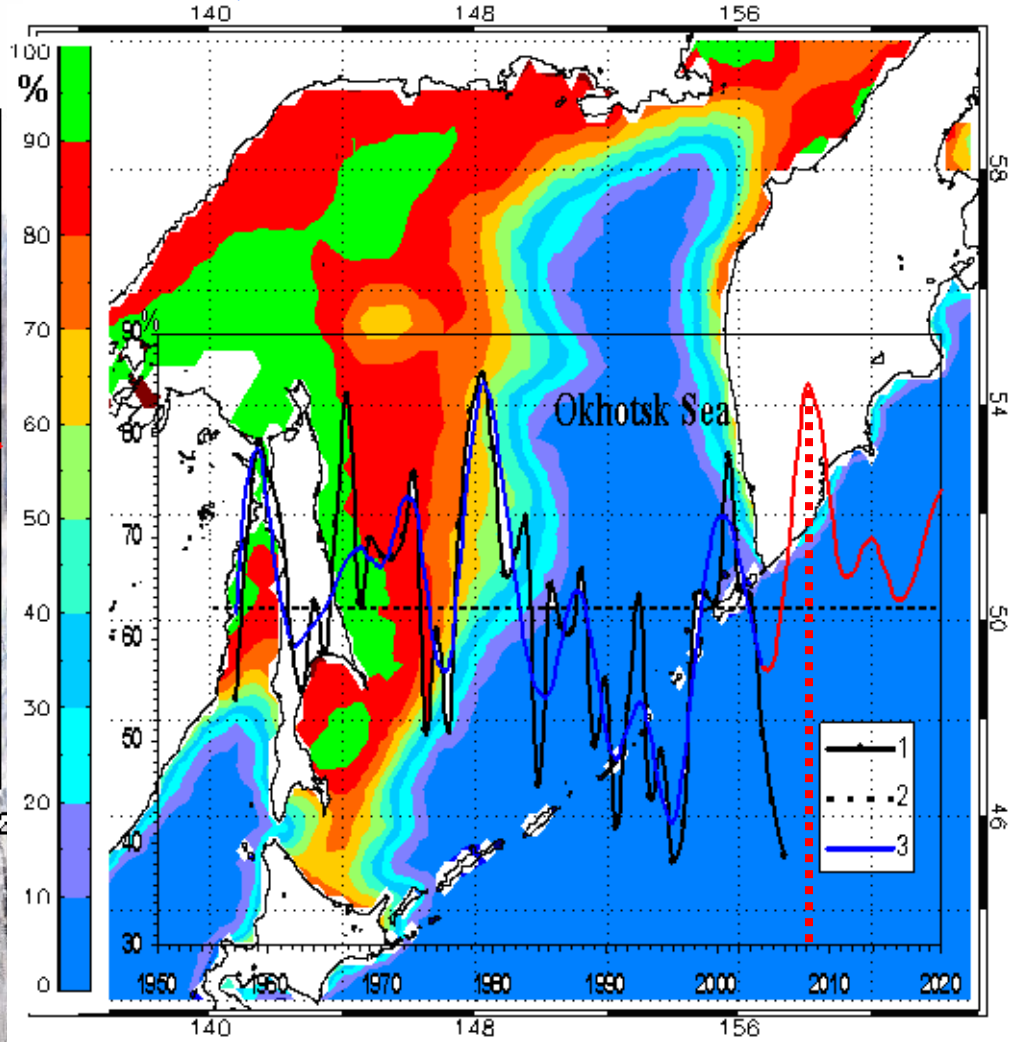


Mean winter (January-April) ice cover and forecast in the Sea of Okhotsk & Bering Sea, after Ustinova, Sorokin (2007)

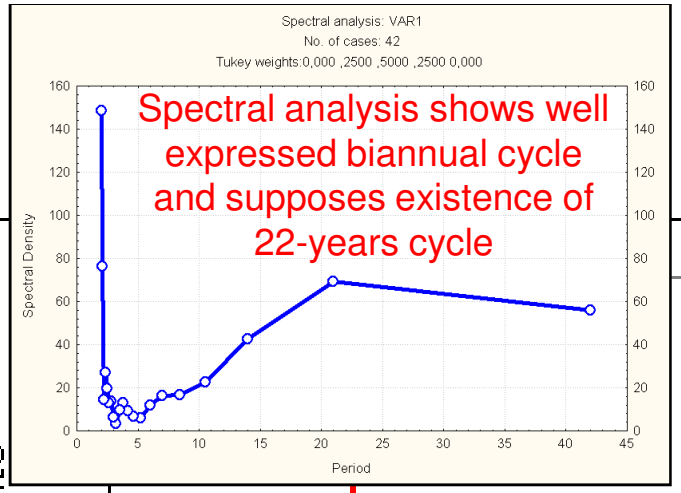


Sea of Okhotsk Ice
February 2008
O. Kusailo, SakhNIRO

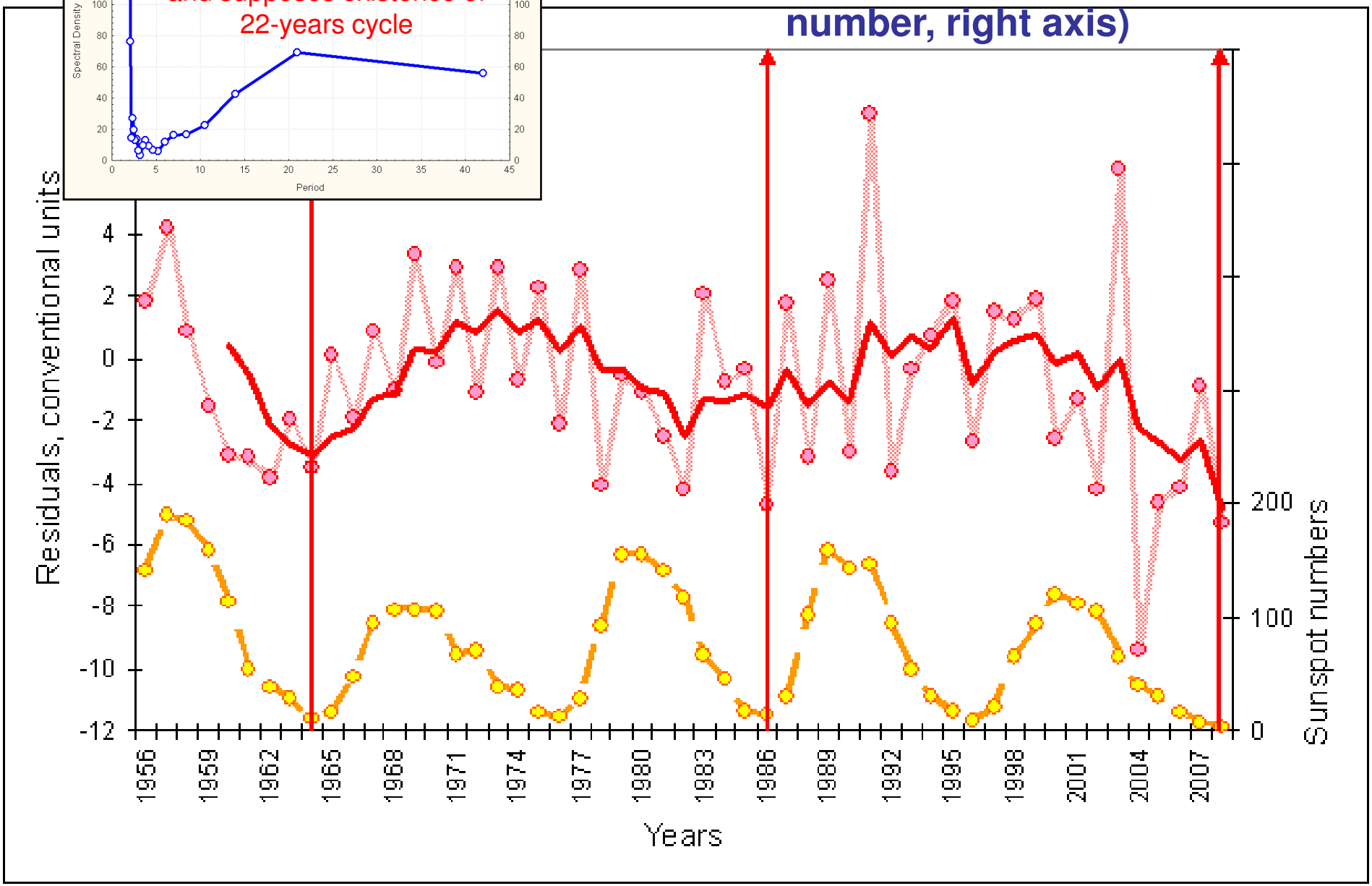
1 – annually averaged, 2 – perennial average; 3 – smoothed graph



Pink salmon catch residuals relative to the ocean heat content, 1956 – 2008, and Solar activity dynamics (expressed in Wolf number, right axis)

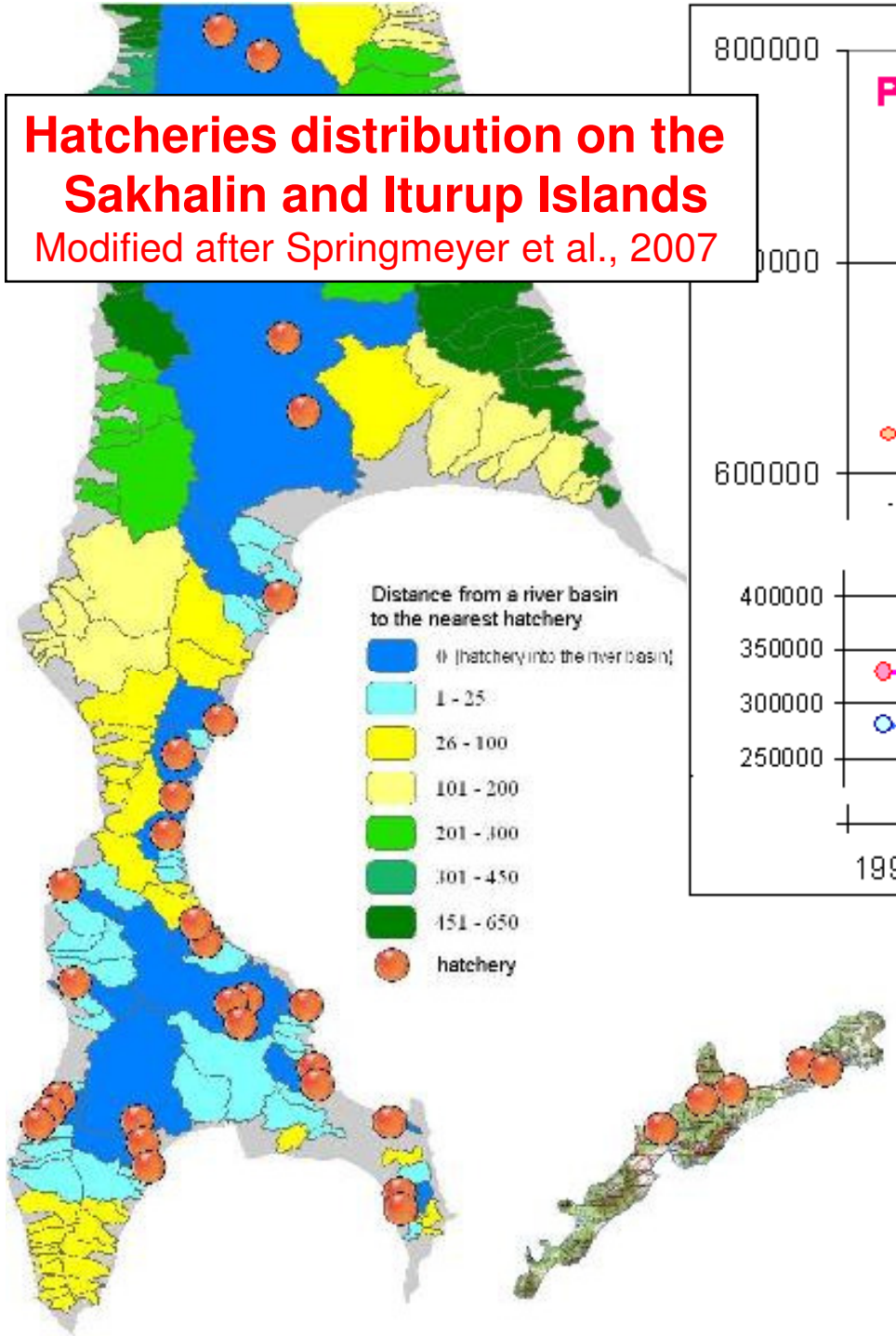


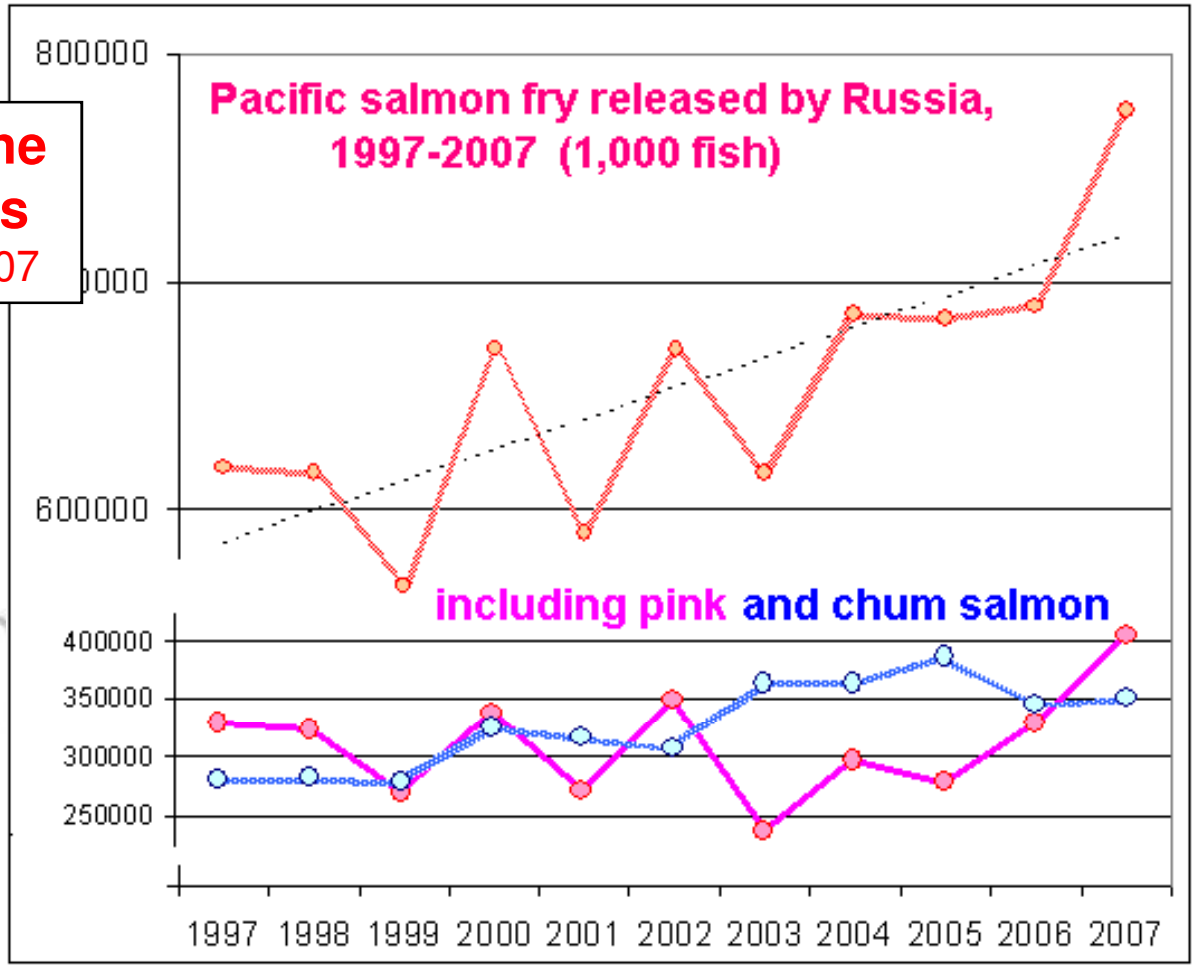
Spectral analysis shows well expressed biannual cycle and supposes existence of 22-years cycle

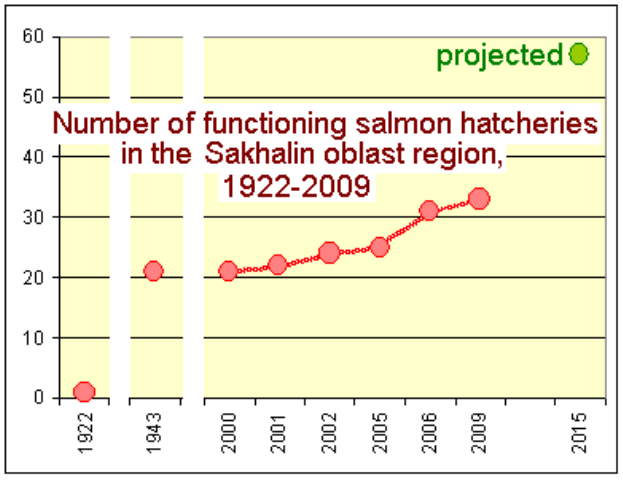


Hatcheries distribution on the Sakhalin and Iturup Islands

Modified after Springmeyer et al., 2007







Morita et al., 2006a (p. 58):

"The estimated contribution of hatchery fish to catches were 35.4% on average but only 17.5% during the past decade"

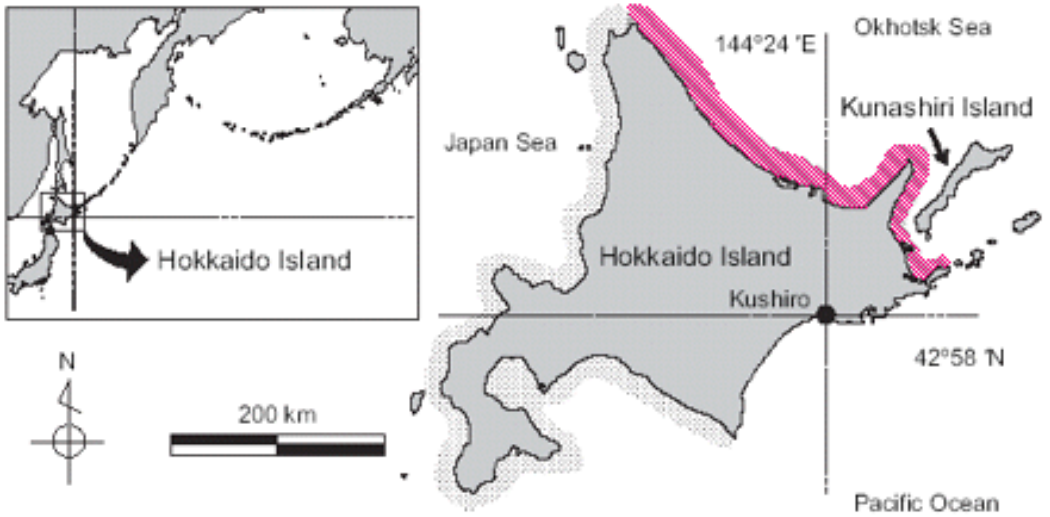
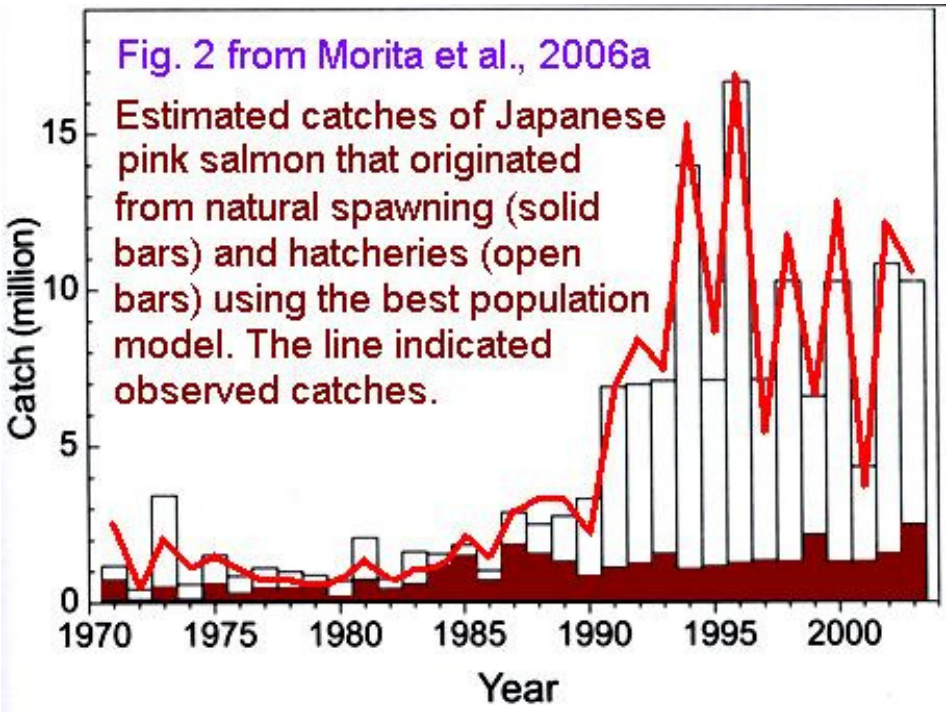


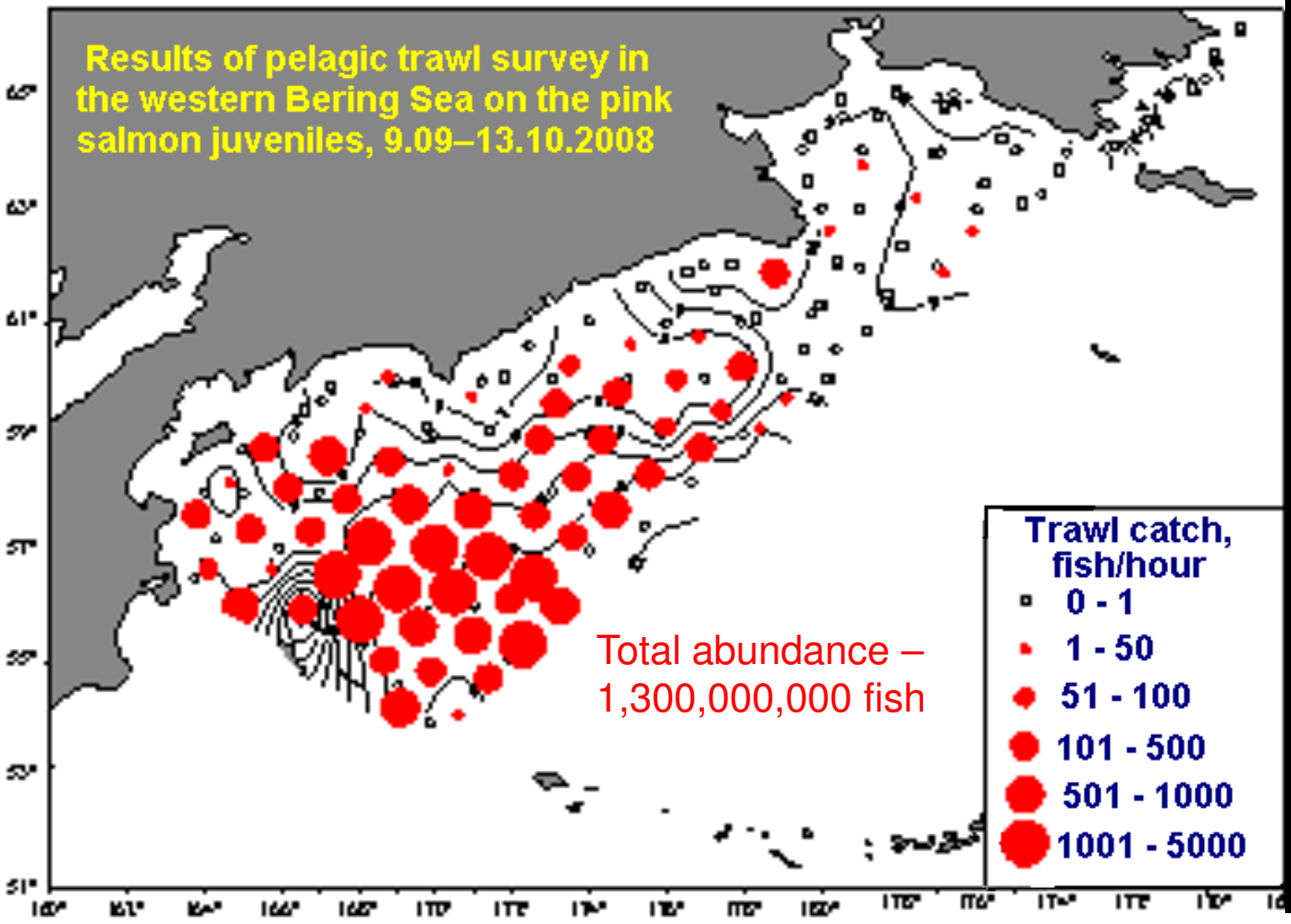
Fig. 1 from Morita et al., 2006b:
Map of Hokkaido Island, Japan, showing the major fishing grounds for... pink salmon (hatched area)

Morita et al., 2006b (p. 1356):

"Contribution of hatchery fish to pink salmon catches was ca. 40% on average in the period 1971-2003"



Pink salmon juveniles distribution in the western Bering Sea in autumn of 2008 and their abundance estimation in 2002-2008, after Shuntov, Temnykh & Kurenkova, 2009



Dates	Pink Biomass 1,000 mt
31.08–09.10. 2002	26,1
14.09–25.10. 2003	15,8
26.09–23.10. 2004	20,1
24.08–12.10. 2006	51,7
06.09–24.10. 2007	4,3
9.09–13.10. 2008	95,3

Thank you for your attention!
Wishing big catches and fatty fish!!

Pink salmon, Sea of Okhotsk, July of 2002