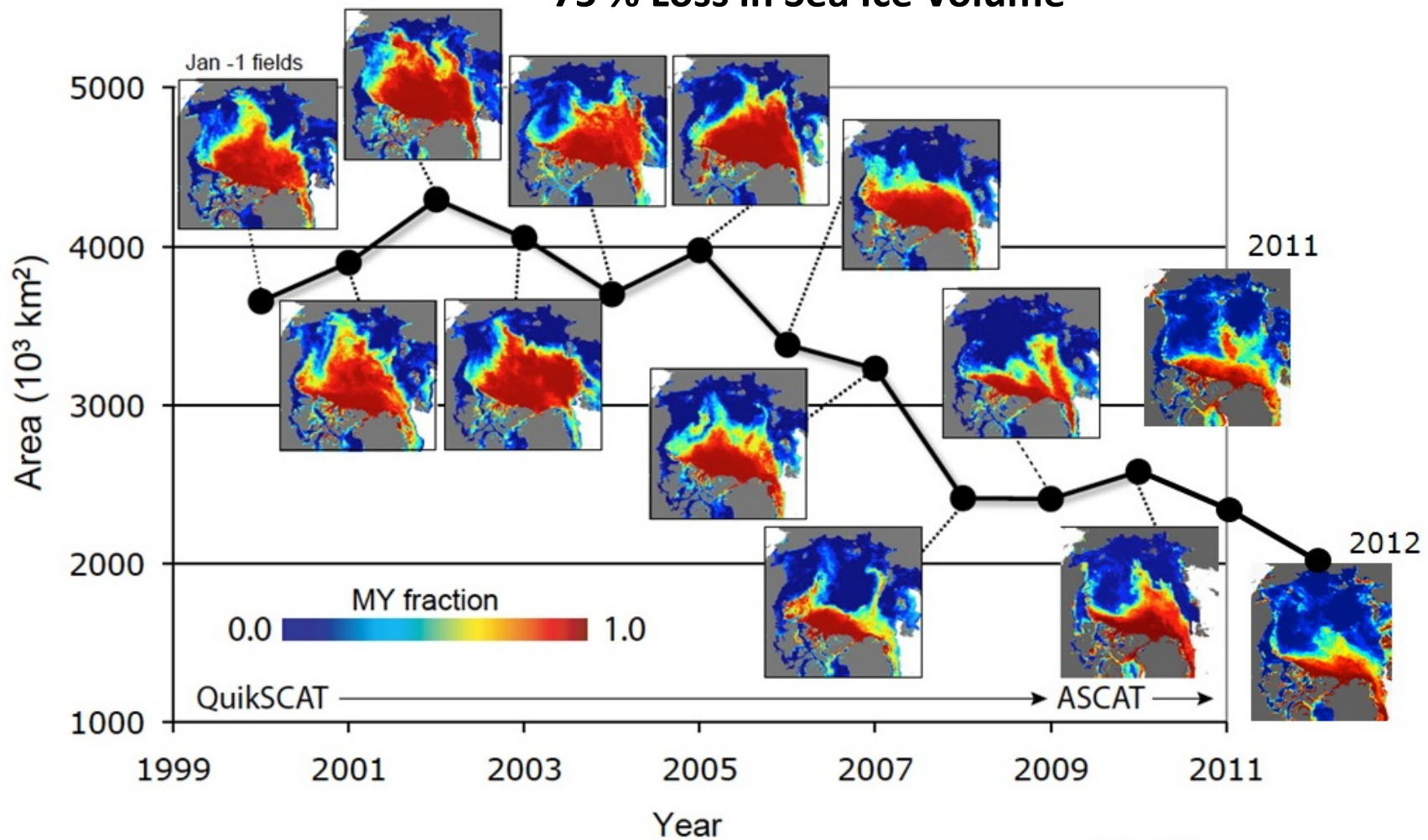


50 % Decline in Arctic Ocean Multiyear Sea Ice Coverage 75 % Loss in Sea Ice Volume



(Kwok, 2010)



2795GT CO₂

565GT CO₂

Real World
Sept 12-13, 2011

Wave Glider



Arctic
Dipole
Winds

Albedo
Feedbacks

Melt stratification

Ocean
Currents

Mackenzie
Plume

East Winds

Alaska

MODIS Sea surface temperature (colors) and true-color composite image (land, sea ice, and clouds)

Temperature color scale

-1 0 1 2 3 4 5 6 7 8 9 10 11 12



NOAA Cross-Line Office Response to Shell 2012 Sea Ice Season Request



Shell Oil
Kulluk

No Data	1-3 Tenths
Sea Ice Free	3-6 Tenths
Open Water	7-10 Tenths

Years	June	July	August	September	October	November	December
2011	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	17
2010	1-3 Tenths	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	1	Sea Ice Free
2009	Open Water	Open Water	Open Water	Open Water	Open Water	20	Open Water
2008	Open Water	Open Water	Open Water	Open Water	Open Water	7	Open Water
2007	Open Water	Open Water	Open Water	Open Water	Open Water	9	Open Water
2006	Open Water	Open Water	Open Water	Open Water	Open Water	20	Open Water
2005	Open Water	Open Water	Open Water	Open Water	Open Water	18	Open Water
2004	Open Water	Open Water	Open Water	Open Water	Open Water	8	Open Water
2003	Open Water	Open Water	Open Water	Open Water	Open Water	17	Open Water
2002	Open Water	Open Water	Open Water	Open Water	Open Water	14	Open Water
2001	Open Water	Open Water	Open Water	Open Water	Open Water	8	Open Water
2000	Open Water	Open Water	Open Water	Open Water	Open Water	23	Open Water
1999	Open Water	Open Water	Open Water	Open Water	Open Water	24	Open Water
1998	Open Water	Open Water	Open Water	Open Water	Open Water	21	Open Water
1997	Open Water	Open Water	Open Water	Open Water	Open Water	1	Open Water
1996	Open Water	Open Water	Open Water	Open Water	Open Water	15	Open Water
1995	Open Water	Open Water	Open Water	Open Water	Open Water	27	Open Water
1994	Open Water	Open Water	Open Water	Open Water	Open Water	7	Open Water
1993	Open Water	Open Water	Open Water	Open Water	Open Water	19	Open Water
1992	Open Water	Open Water	Open Water	Open Water	Open Water	13	Open Water
1991	Open Water	Open Water	Open Water	Open Water	Open Water	18	Open Water
1990	Open Water	Open Water	Open Water	Open Water	Open Water	15	Open Water