Understanding (some of) the Arctic Ocean: the Pacific inflow via the Bering Strait - change, implications of change, and solving the 60-yr old riddle of what drives it

In the last 30 years, the Arctic has lost ~ 75% of its summer sea ice volume. This dramatic change is driven (it is thought) by a host of atmospheric and oceanic drivers. From the ocean side, both the Atlantic and Pacific oceans have influence on the Arctic - Atlantic waters entering through the Fram Strait and Barents Sea, and the fresher (and seasonally warmer) Pacific waters entering through the Bering Strait, a narrow (85km), shallow (50m) passage between the USA and Russia. Though this Pacific inflow (1Sv) is smaller than the net Atlantic inflow (~3-7Sv, depending on whom you ask), it is found to have a clear influence on the melt back of sea ice in the western Arctic. Year-round mooring observations in the Bering Strait show significant flow increase, warming and freshening since the 1990s, the only Arctic gateway to show significant trends. But what drives the Bering Strait flow in the first place? And what is causing the recent changes? And why (polar bears aside) should you care about a small strait far away anyhow? Starting from an overview of key Arctic Oceanography and recent Arctic Change, we will move to addressing the 60-yr old riddle of what drives the Pacific Inflow to the Arctic Ocean and speculate on some possible implications of the recent changes observed.

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