# AMOC Collapse Bibliography

- **Most Relevant: Exceeding 1.5°C global warming could trigger multiple climate tipping points**
    - **Estimates thresholds for major climate tipping points and their likely crossing points**
    - **AMOC Specific:**
        - **Suggests ~15% weakening over past 50 years (low confidence)**
        - **Caused by Arctic precipitation, Greenland runoff, sea-surface warming => stratification**
        - **Early-warning signals suggest stability already reducing**
        - **Some models collapse between 1.4–2.5 °C global warming**
- Global and European climate impacts of a slowdown of the AMOC in a high resolution GCM
    - High-resolution model of AMOC weakening and its climate impacts
    - AMOC Specific:
        - Freshwater forcing reduces deep convection
        - Produces strong NH cooling and southward ITCZ shift
        - Shows major European and Amazon rainfall changes
        - Reduction varies widely among models (12–54 %)
- Competition between global warming and an abrupt collapse of the AMOC in Earth's energy imbalance
    - Examines energy-budget changes after an AMOC shutdown
    - AMOC Specific:
        - Collapse causes temporary global cooling despite rising GHGs
        - Identifies TOA radiation and OLR/ASR footprints for detection
        - Demonstrates potential hiatus post-collapse (15–40 yrs)
- Amplified Inception of European Little Ice Age by Sea Ice–Ocean–Atmosphere Feedbacks
    - Simulates feedbacks driving Little Ice Age cooling
    - AMOC Specific:
        - Sea-ice expansion freshens subpolar Atlantic
        - Reduced heat transport triggers European cooling
        - Shows feedbacks can self-sustain reduced AMOC state
- Causal pathway from AMOC to Southern Amazon rainforest indicates stabilising interaction between two climate tipping elements
    - Analysis of observed AMOC–Amazon interaction
    - AMOC Specific:
        - AMOC weakening increases dry-season rainfall in Amazon
        - Suggests some stabilising feedbacks between tipping elements
        - Quantifies ~+4.8 % rain per 1 Sverdrup AMOC weakening
- Ocean circulation and climate during the past 120,000 years
    - Reviews paleoclimate evidence for abrupt circulation changes

    - AMOC Specific:
        - Salt-advection feedback causes bistability and abrupt transitions
        - Links AMOC shutdowns to Heinrich and Dansgaard–Oeschger events
        - Demonstrates multiple stable modes and threshold behaviour
- Long-term Climate Change: Projections, Commitments and Irreversibility
    - Summarises long-term projections and abrupt-change risks
    - AMOC Specific:
        - Very likely to weaken this century by 11–34 %
        - Caused by surface warming & stratification (secondary freshwater effects)
        - Collapse this century “very unlikely,” but bistability confirmed in models
        - Predicts that threshold crossing possible under sustained high forcing beyond 2100
- Physics-based early warning signal shows that AMOC is on tipping course
    - Develops measurable early-warning indicator for AMOC collapse
    - AMOC Specific:
        - Uses freshwater transport at 34°S as a predictor
        - Signal minimum occurs ~9–41 years before tipping in models
        - Framework for real-time monitoring of collapse risk
- Warning of a forthcoming collapse of the Atlantic meridional overturning circulation
    - Predicts timing of AMOC collapse using observed proxies
    - AMOC Specific:
        - Suggests collapse by ~2050
        - Based on SST and salinity fingerprints
        - Indicates increasing instability and loss of resilience
- AMOC stability amid tipping ice sheets: the crucial role of rate and noise
    - Tests sensitivity of AMOC to different ice-melt scenarios
    - AMOC Specific:
        - Rapid, localised meltwater strongly destabilises AMOC
        - Gradual or widespread input reduces risk
        - Highlights importance of forcing rate and distribution
- Simulating AMOC tipping driven by internal climate variability with a rare event algorithm
    - Investigates internal variability as trigger for tipping
    - AMOC Specific:
        - Collapse possible without external forcing
        - Identifies noise induced tipping from ocean atmosphere feedbacks
        - Adds uncertainty to prediction timelines
- Revisiting climate impacts of an AMOC slowdown: dependence on freshwater locations in the North Atlantic
    - Synthesises evidence for recent AMOC weakening and effects
    - AMOC Specific:
        - Combines proxy, RAPID, and model records
        - Emphasises salinity and surface heat flux drivers
        - Describes ITCZ and North Atlantic cooling patterns
- Feedback Processes causing an AMOC Collapse in the Community Earth System Model

    - Analyses AMOC collapse in full Earth system model
    - AMOC Specific:
        - Key feedbacks: salt advection, sea-ice melt, gyre transport
        - Reveals threshold structure and multi-stability
        - Collapse leads to rapid heat-transport loss and subpolar cooling
- Overlooked possibility of a collapsed Atlantic Meridional Overturning Circulation in warming climate
    - Challenges model consensus that AMOC will only moderately weaken
    - AMOC Specific:
        - Bias corrected model shows complete collapse ~300 years after CO2 doubling
        - Caused by thermal buoyancy loss; salt advection and freshwater feedbacks
        - Suggests modern AMOC already unstable
        - Causes strong North Atlantic cooling (up to −7 °C), sea ice expansion, ITCZ shift south
        - Concludes CMIP5 models likely underestimate collapse risk even without meltwater input

Foundational Material:

- Practical Meteorology An Algebra-based Survey of Atmospheric Science ROLAND STULL
- MetOffice