

# Cold Ocean Currents – Oceanography Notes

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## 1. Introduction

Cold ocean currents are large masses of relatively cold water that flow from higher latitudes (polar or subpolar regions) towards lower latitudes (tropical or subtropical regions). They significantly influence global climate, marine productivity, and coastal geomorphology.

## 2. Characteristics of Cold Currents

- Originate in polar or temperate regions and move equatorward.
- Flow predominantly along the western coasts of continents in most ocean basins.
- Lower the temperature of adjacent coastal areas.
- Associated with upwelling and high nutrient concentration.
- Reduce evaporation and create dry coastal climates.

## 3. Causes of Cold Ocean Currents

- Planetary wind systems (Westerlies and Polar Easterlies).
- Coriolis force deflecting currents.
- Upwelling due to offshore wind movement.
- Density differences in thermohaline circulation.
- Configuration of continents and ocean basins.

## 4. Major Cold Currents of the World

- Labrador Current – North Atlantic Ocean
- Canary Current – North Atlantic Ocean
- California Current – North Pacific Ocean
- Peru (Humboldt) Current – South Pacific Ocean
- Benguela Current – South Atlantic Ocean
- West Australian Current – Indian Ocean

## **5. Climatic Significance**

- Create coastal deserts (e.g., Atacama and Namib Deserts).
- Cause fog formation where cold and warm air masses meet.
- Reduce rainfall along western continental margins.
- Influence cyclone paths and intensity.

## **6. Economic Importance**

- Support major fishing grounds due to nutrient-rich upwelling.
- Influence maritime navigation and port activities.
- Impact coastal agriculture through climatic effects.

## **7. Comparison with Warm Currents**

Cold currents decrease coastal temperatures, enhance marine productivity, and are often linked with arid coastal climates. In contrast, warm currents increase temperature and humidity and moderate cold climates.