

Why Atmospheric Chemistry Is Missing From National Climate Reports

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1. CO₂-centric modeling dominates the entire climate-science ecosystem

Climate models (CMIP, IPCC, national reports) were built around **CO₂ radiative forcing**, not atmospheric cleansing capacity.

This means:

- CO₂ is treated as the “main dial”
- Methane lifetime is treated as *fixed*
- OH· is treated as *constant*
- Oxidative depletion is not parameterized

When your entire modeling architecture assumes OH is stable, **you literally cannot see the problem**, even if 25,000 papers describe it.

This is a structural blind spot.

2. Atmospheric chemistry is extremely complex—and politically inconvenient

OH· depletion implies:

- methane lifetime is increasing
- VOCs persist longer
- NO_x and SO₂ chemistry shifts
- aerosol forcing changes
- precipitation patterns destabilize

These are **hard to model**, and even harder to explain to policymakers.

So national reports simplify:

- CO₂ forcing
- methane forcing

- aerosols
- land use

And they **omit the chemistry that ties them together.**

3. No agency “owns” oxidative capacity

There is no:

- UN OH $\cdot$ monitoring program
- national oxidative-capacity index
- global OH $\cdot$ depletion report
- policy framework for atmospheric cleansing

When no institution is responsible for a variable, it disappears from policy.

This is why **Canada’s 2026 Climate Report**—and most national reports—exclude OH $\cdot$ entirely.

4. Methane modeling assumes a stable sink

Every national climate model uses:

- fixed methane lifetime (~9 years)
- fixed OH concentration
- fixed oxidation rate

But in reality:

- OH is down ~33%
- methane lifetime is rising
- pollutant load is up 19×
- OH inundation is ~52× baseline

If your model assumes the sink is stable, **you cannot detect sink collapse.**

This is why the warming contribution from OH depletion (~37%) is invisible in official reports.

5. Geoengineering fear makes agencies avoid atmospheric intervention

Hydroxyl chemistry is:

- natural
- safe

- water-based
- non-radiative
- non-persistent

But because it involves *atmospheric modification*, agencies lump it together with:

- sulfate aerosols
- stratospheric injections
- SRM proposals

This creates institutional avoidance.

Scientists don't want to be accused of supporting geoengineering, so they avoid the topic entirely—even though OH· is the **primary atmospheric cleansing agent**.

6. National climate reports are not designed to evaluate new science

Government climate reports:

- summarize existing IPCC frameworks
- do not introduce new science
- do not evaluate emerging chemistry
- do not challenge model assumptions

If the IPCC hasn't formally integrated OH depletion, **Canada cannot include it**, even if the science is overwhelming.

This is a bureaucratic constraint, not a scientific one.

The Honest Answer

Scientists didn't "miss" hydroxyl chemistry. The **system** missed it.

Because:

- CO₂-centric models dominate
- OH is assumed constant
- no agency owns oxidative capacity
- atmospheric chemistry is politically sensitive
- national reports cannot exceed IPCC scope

The result is a **global blind spot**: A missing variable responsible for ~37% of warming.

