RC1

The lead author is one of the world's key scholars in Historical Climatology and Climate History cooperating with natural scientists and historians, mainly from Europe. The Huaynaputina is a stratovolcano in southern Peru. Its eruption in February 1600 CE triggered a persistent summer and winter cooling in the North Atlantic region during the early 17. It-was the largest eruption in the Andes in historical times. The paper explores the eruption-induced cooling mechanism in some detail. The study compares simulations and a North Atlantic subpolar gyre shift in annual proxies in archives of nature to more detailed with documentary evidence.

The Huyaputina injected fewer sulfates into the stratosphere than other LIA eruptions with a compatible cooling effect. In particular the eruption generated much more and longer lasting winter cooling than summer cooling in Central and Northern Europe, which is unusual. It is hypothesized that reduced heat transport by the North Atlantic Subpolar Gyre SPG in terms of a cooling of the North Atlantic may be one of the reasons, though many aspects remain unclear. Historical written records as well as contemporary historical observations of relevant climate and environmental conditions demonstrate patterns of cooling and sea ice expansion consistent with, but not necessarily indicative of an eruption trigger for the proposed SPG slowdown mechanism

The arguments of scientists and modellers should still be improved in view of the limited understanding of people from the historical sciences for processes in the ocean. Some relevant studies might still be included: The herring catch on the west coast of Scotland declined remarkably between 1585 and 1597 which Parry (1978) interpreted this as an escape of this cold-sensitive species from the cold water masses advancing southwards. The detailed temperature reconstruction by Dobrovolny et al. (2010) for Western and Central Europe since 1500 CE was overlooked. It contains seasonal temperature that are explained in more detail by the recent synthesis by Pfister and Wanner (2021) that is published on 6th September. These data show that the very severe winter of 1600 preceded the Huynaputina eruption in contrast to the cold winter in 1601. Likewise, just spring 1600 was very cold. On the other hand, the summer 1601 was very cold.

We thank the author for his generous comments on the manuscript. We will add discussion of previous historical climatology studies relevant to the timing of winter cooling and changing North Atlantic currents to the paragraph in lines 73-79. The fish catch data in Parry 1978—as well as Jürgen Alheit and Eberhard Hagen, "Long-Term Climate Forcing of European Herring and Sardine Populations," *Fisheries Oceanography* 6 (1997): 130–39—indicate declining herring catch at the north end of their range and expansion of the south end of their range by the 1590s, which would be consistent with our finding of cooling preceding the 1600 eruption; although as discussed in Poul Holm et al. "The North Atlantic Fish Revolution (ca. AD 1500)." *Quaternary Research*, 2019, larger shifts in the fishing industry, including the abundance of previously unexploited fisheries being discovered off North America, make it difficult to attribute fluctuations in European fish catch during the late 1500s directly to climatic changes. We will also include these indications of changing ocean currents from historical fish catch in the paragraph currently in lines 73-79. The Moreno-Chamarro et al. 2017 studies presenting the SPG shift mechanism already considered the Dobrovolny et al. 2010 reconstructions (as well the Luterbacher et al. 2004 reconstruction). We will include these studies, too, when discussing the onset of colder winter temperatures over Europe during the 1590s.