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## Will COVID-19 affect ECL forecasts on the 46<sup>th</sup> anniversary of the Sygna storm?

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Australia's Eastern Seaboard is set to be lashed by the first real East Coast Low (ECL) of the cold season over the next couple of days beginning on 22 May 2020, (Figure 1). Unlike the February 5-10 2020 ECL, which originated in the tropics and impacted Southeast Queensland (Mortlock and Somerville 2020), this one has its origin in the cold Southern Ocean and will mostly impact Sydney. The cold pool of upper atmospheric air which is expected to drive intensification of this ECL has already dumped snow on the Alps as it passed over Southeast Australia.

The early stage development of this storm is remarkably similar to the *Sygna storm*: one of the most powerful East Coast Lows on record, and one of the worst storms to impact Sydney and Newcastle. Exactly 46 years ago, on the 21<sup>st</sup> of May 1974, a precursor to the *Sygna storm* was identified as a pool of very cold air over Adelaide (Bridgman 1985). After dropping heavy snow on the Alps it moved into the Tasman Sea and intensified into a powerful ECL, where it not only wrecked the Norwegian bulk carrier the *Sygna*, but caused extensive damage to coastal infrastructure including the destruction of Manly's famous harbour pool.

While this weekend's storm is forecast to produce typical ECL conditions of strong winds, heavy rainfall and dangerous surf, it is not forecast to reach the magnitude of truly destructive storms such as the *Sygna*, or the more recent Pasha Bulka Storm of 2007. However, ECL have proven notoriously difficult to predict. One of the key drivers of ECL intensification is a cold pool of air in the upper atmosphere, hence the alpine snow which often precedes intense storms. The behaviour of these cold pools of air presents a challenge for numerical forecast models under usual circumstances, but the COVID-19 pandemic has made their job even more difficult.

### COVID-19 Grounding of Flights Impacting Global Weather Data Collection

Weather forecast models rely on a vast network of observations to describe the current state of the atmosphere. According to the European Centre for Medium-range Weather Forecasting (ECWMF) aircraft-based observations are second only to satellite data in their impact on forecasts. The number of aircraft observations has plummeted since the COVID-19 pandemic effectively grounded most of the world's commercial airline fleet (Figure 2). Prior to COVID-19 Sydney to Melbourne was one of the world's busiest flight routes, and weather observations from those flights provided valuable information for developing weather forecasts - especially for the simulation of complex weather systems like ECL. A ECMWF study in 2019 showed that excluding half of the regular number of aircraft observations had a significant impact on forecasts of upper atmospheric winds and temperature, especially in the 24-hr ahead.

Whether or not a lack of aircraft observations will affect forecasts for tomorrow's ECL remains to be seen. While this event is unlikely to reach the magnitude of its historical counterpart, the May 1974 Sygna storm, it will provide a timely reminder that ECL are a regular part of Tasman Sea weather and climate; and if you're on Australia's eastern seaboard then get ready for the first large maritime storm of the winter.

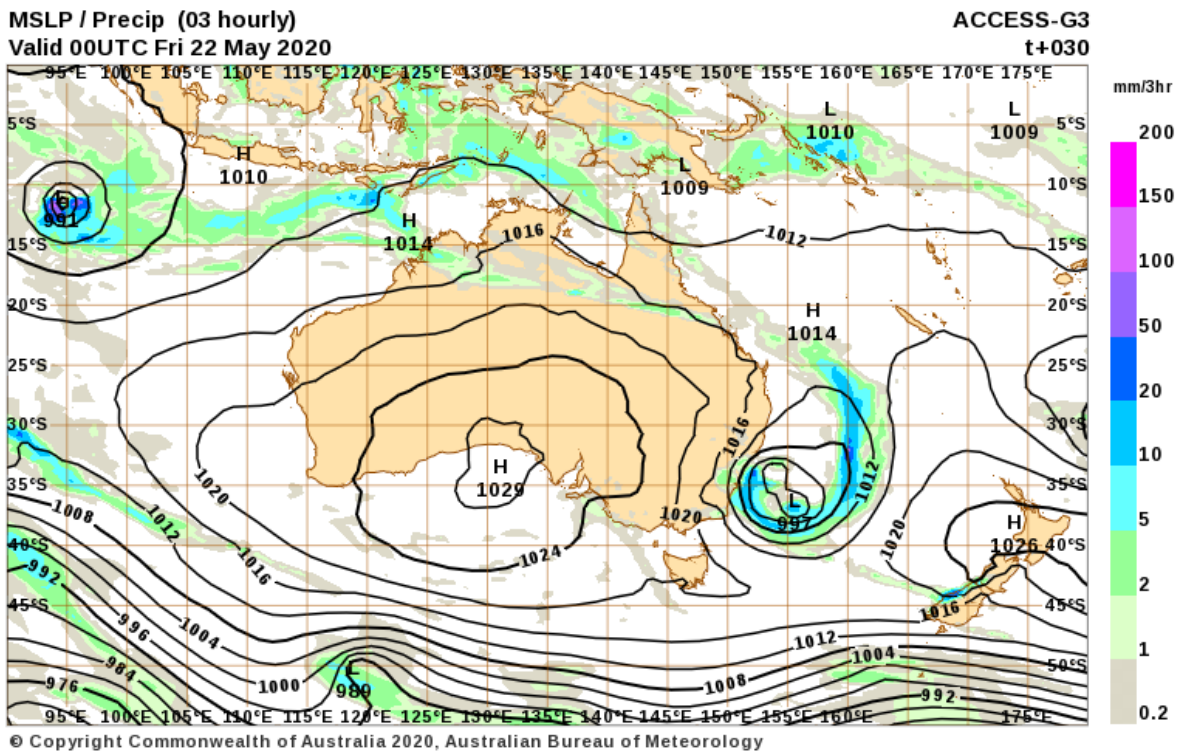


Figure 1BOM numerical forecast for a Tasman Sea ECL on Friday the 22<sup>nd</sup> of May

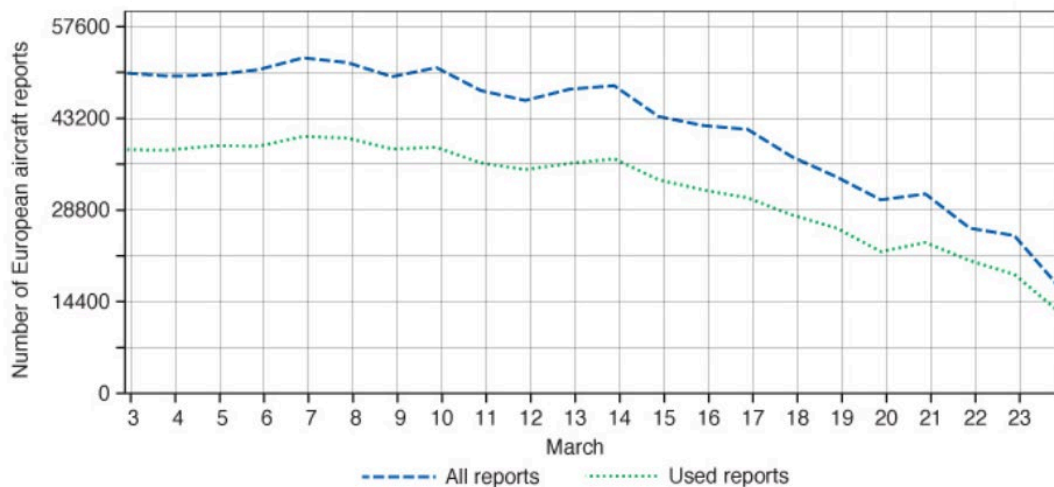


Figure 2 Number of aircraft reports over Europe received and used at ECMWF per day (<https://www.ecmwf.int/en/about/media-centre/news/2020/drop-aircraft-observations-could-have-impact-weather-forecasts>).



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## References

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<https://riskfrontiers.com/february-2020-east-coast-low-sydney-impacts/>