

Hacia un clima más seco y cálido: ríos revueltos

J. León-Muñoz^{1,2}, R. Aguayo², R. Montes³ y D. Soto³

¹ Facultad de Ciencias, Universidad Católica de la Santísima Concepción, Concepción, Chile

² Facultad de Ciencias Ambientales, Centro EULA, Universidad de Concepción, Concepción, Chile

³ Centro Interdisciplinario para la Investigación Acuícola (Incar), Universidad de Concepción, Concepción, Chile

*jleon@ucsc.cl

- Aguayo, R., León-Muñoz, J., Vargas-Baecheler, J., Montecinos, A., Garreaud, R., Urbina, M., Soto, D. & Iriarte, J. L. 2019. The glass half-empty: climate change drives lower freshwater input in the coastal system of the Chilean Northern Patagonia, *Climatic Change*: 155, 417-435.
- Aguayo, R., León-Muñoz, J., Garreaud, R. & Montecinos, A. 2021. Hydrological droughts in the southern Andes (40–45°S) from an ensemble experiment using CMIP5 and CMIP6 models, *Scientific Reports*: 11, 5530.
- Bravo, S., Pozo, V. & Silva, M. 2008. The tolerance of *Caligus rogercresseyi* to salinity reduced in southern Chile. *Bull. Eur. Ass. Fish. Pathol.*, 28: 198-206.
- Bravo, S. & Treasurer, J. 2023. The management of the sea lice in Chile: A review. *Rev. Aquac.* (doi: 10.1111/raq.12815).
- Dávila, P., Figueroa, D. & Müller, E. 2002. Freshwater input into the coastal ocean and its relation with the salinity distribution off austral Chile (35-55°s), *Continental Shelf Research*, 22: 521-534.
- González, L. & Carvajal, J. 2003. Life cycle of *Caligus rogercresseyi*, (Copepoda: Caligidae) parasite of Chilean reared salmonids. *Aquaculture*, 220: 101-117.
- Iriarte, J., González, H., Liu, K., Rivas, C. & Valenzuela, C. 2007. Spatial and temporal variability of chlorophyll and primary productivity in surface waters of southern Chile (41.5–43° S), *Estuarine, Coastal and Shelf Science*, 74: 471-480.
- Iriarte, J., Pantoja, S. & Daneri, G. 2014. Oceanographic Processes in Chilean Fjords of Patagonia: From small to large-scale studies, *Progress in Oceanography*, 129: 1-7.
- Iriarte, J., León-Muñoz, J., Marcé, R., Clément, A. & Lara, C. 2017. Influence of seasonal freshwater streamflow regimes on phytoplankton blooms in a Patagonian fjord, *New Zealand Journal of Marine and Freshwater Research*, 51: 304-315.
- Jacob, B., Tapia, F., Daneri, G., Iriarte, J., Montero, P., Sobarzo, M. & Quiñones, R. 2014. Springtime size-fractionated primary production across hydrographic and PAR-light gradients in Chilean Patagonia (41-50°S), *Progress in Oceanography*, 129: 75-84.
- Jahnsen-Guzmán, N., Lagos, N., Lardies, M., Vargas, C., Fernández, C., San Martín, V., Saavedra, L., Cuevas, L., Quijón, P. & Duarte, C. 2021. Environmental refuges increase performance of juvenile mussels *Mytilus chilensis*: Implications for mussel seedling and farming strategies. *Science of The Total Environment*, 751: 141723.
- Molinet, C., Astorga, M., Cares, L., Diaz, M., Hueicha, K., Marín, S., Matamala, T. & Soto, D. 2021. Vertical distribution patterns of larval supply and spatfall of three species of Mytilidae in a Chilean fjord used for mussel farming: Insights for mussel spatfall efficiency. *Aquaculture*, 535: 736341.
- León-Muñoz, J., Urbina, M., Garreaud, R. & Iriarte, J. 2018. Hydroclimatic conditions trigger record harmful algal bloom in western Patagonia (summer 2016), *Scientific Reports*, 8: 1330.
- León-Muñoz, J., Aguayo, R., Marcé, R., Catalán, N., Woelfl, S., Nimptsch, J., Arismendi, I., Contreras, C., Soto, D. & Miranda, A. 2021. Climate and Land Cover Trends Affecting Freshwater Inputs to a Fjord in Northwestern Patagonia, *Frontiers in Marine Science*, 8: 628454.
- Quiñones, R., Fuentes, M., Montes, R., Soto, D. & León-Muñoz J. 2019. Environmental issues in Chilean salmon farming: a review. *Rev. Aquac.*, 11: 375-402.
- Silva, N. & Neshyba, S. 1979. On the southernmost extension of the Perú-Chile undercurrent. *Deep-Sea Research* 26A: 1378-1393.
- Silva, N. 2008. Dissolved oxygen, pH and nutrients in the austral Chilean channels and fjords. En: Silva N, Palma S. (Eds). *Progress in the Oceanographic Knowledge of Chilean Interior Waters, from Puerto Montt to Cape Horn*. Comité Oceanográfico Nacional & Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile, pp. 37-44.
- Soto, D., León-Muñoz, J., Dresdner, J., Luengo, C., Tapia, F. & Garreaud, R. 2019. Salmon farming vulnerability to climate change in southern Chile: understanding the biophysical, socioeconomic and governance links, *Reviews in Aquaculture*, 11: 354-374.
- Soto, D., León-Muñoz, J., Garreaud, R., Quiñones, R. & Morey, F. 2021. Scientific warnings could help to reduce farmed salmon mortality due to harmful algal blooms, *Marine Policy*, 132: 104705.
- Ugarte, A., Romero, J., Fariás, L., Sapiains, R., Aparicio-Rizzo, P., Ramajo, L., Aguirre, C., Masotti, I., Jacques, M., Barrera, F., Billi, M., Boisier, J., Carbonell, P., De la Maza, L., De la Torre, M., Espinoza-González, O., Faúndez, J., Muñoz, F., Garreaud, R., Guevara, G., González, M., Guzmán, L., Ibáñez, J., Ibarra, C., Marín, A., Mitchell, R., Moraga, P., Narváez, D., O’Ryan, R., Pérez, C., Pilgrin, A., Pinilla, E., Rondanelli, R., Salinas, M., Sánchez, R., Sanzana, K., Segura, C., Valdebenito, P., Valenzuela, D., Vásquez, S. & Williams, C. 2022. «Marea roja» y cambio global: elementos para la construcción de una gobernanza integrada de las Floraciones de Algas Nocivas (FAN). Centro de Ciencia del Clima y la Resiliencia (CR)2, (ANID/FONDAP/15110009), 84 pp. Disponible en www.cr2.cl/fan.
- Yatabe, T., Arriagada, G., Hamilton-West, C. & Urcelay, S. 2011. Risk factor analysis for sea lice, *Caligus rogercresseyi*, levels in farmed salmonids in southern Chile. *J. Fish Dis.*, 34: 345-354.