

Multi-language glossary of common terminology and LEWS descriptors

- About the glossary

A glossary of English terms used by the LEWS community is presented. The example is proposed in form of a table including terms, definition, abbreviation, synonymous and the references in which the term has been mentioned.

- List of references

Alfieri, L., Salamon, P., Pappenberger, F., Wetterhall, F., Thielen, J. (2012). Operational early warning systems for water-related hazards in Europe. *Environ. Sci. Pol.* 21, 35–49.
<https://doi.org/10.1016/j.envsci.2012.01.008>.

Baron I., Supper R., Ottowitz D. (2012). Safeland deliverable 4.6: report on evaluation of mass movement indicators. European project Safeland, Grant Agreement No. 226479, 382 pp. Available at
<http://www.safeland-fp7.eu>

Berti, M., Martina, M.L.V., Franceschini, S., Pignone, S., Simoni, A., Pizziolo, M. (2012). Probabilistic rainfall thresholds for landslide occurrence using a Bayesian approach. *J. Geophys. Res.* 117, F04006.
<https://doi.org/10.1029/2012JF002367>.

Brunetti, M.T., Peruccacci, S., Rossi, M., Luciani, S., Valigi, D., Guzzetti, F. (2010). Rainfall thresholds for the possible occurrence of landslides in Italy. *Nat. Hazards Earth Syst. Sci.* 10, 447–458.
<https://doi.org/10.5194/nhess-10-447-2010>.

Calvello, M. (2017). Early warning strategies to cope with landslide risk. *Riv. Ital. Geotec.* 2, 63–69.
<https://doi.org/10.19199/2017.2.0557-1405.063>.

Cambridge English Dictionary (last access: 31.05.2022)

Cruden, D.M., Varnes, D.J., 1996, *Landslide Types and Processes*, Transportation Research Board, U.S. National Academy of Sciences, Special Report, 247: 36-75

Devoli G., Colleuille H., Sund M., Wasrud J. (2021). Seven Years of Landslide Forecasting in Norway—Strengths and Limitations. In: Springer Nature Switzerland AG 2021, N. Casagli et al. (eds.), *Understanding and Reducing Landslide Disaster Risk*, ICL Contribution to Landslide Disaster Risk Reduction, (page 267-274)
https://doi.org/10.1007/978-3-030-60311-3_30

Di Biagio, E., Kjekstad, O. (2007). In: *Early Warning. Instrumentation and Monitoring Landslides*. 2nd Regional Training Course, RECLAIM II. Phuket, Thailand, 29th January–3rd February 2007.

Dictionary.com.

Fell, R., and D. Hartford. (1997). Landslide risk management. Pages 51–109 in D. Cruden R. and Fell (eds.), *Landslide risk assessment*. Balkema, Rotterdam.

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Gill, J. C., and Malamud, B. D. (2016). Hazard interactions and interaction networks (cascades) within multi-hazard methodologies. *Earth System Dynamics*, 7(3), 659-679. <https://doi.org/10.5194/esd-7-659-2016>

Greco, R. and Pagano, L. (2017). Basic features of the predictive tools of early warning systems for water-related natural hazards: examples for shallow landslides. *Nat. Hazards Earth Syst. Sci.* 17, 2213–2227. <https://doi.org/10.5194/nhess-17-2213-2017>.

Guzzetti, F., Stark, C.P., Salvati, P. (2005). Evaluation of flood and landslide risk to the population of Italy. *Environmental Management*, 36(1), 15-36 <https://doi.org/10.1007/s00267-003-0257-1>

Guzzetti, F., Peruccacci, S., Rossi, M., Stark, C.P. (2007). Rainfall thresholds for the initiation of landslides in central and southern Europe. *Meteorol. Atmos. Phys.* 98, 239–267. <https://doi.org/10.1007/s00703-007-0262-7>.

Guzzetti, F., Mondini, A. C., Cardinali, M., Fiorucci, F., Santangelo, M., & Chang, K. T. (2012). Landslide inventory maps: New tools for an old problem. *Earth-Science Reviews*, 112(1-2), 42-66.

Guzzetti F., Gariano S., Peruccacci S., Brunetti M.T., Marchesini I., Rossi M., Melillo M. (2020). Geographical landslide early warning systems. *Earth-Science Reviews* (2020) 102973 <https://doi.org/10.1016/j.earscirev.2019.102973>

Hamilton, R.M., Wiecek, G.F., Evans, S.G., Kato, T., Sobolev, G., Wyss, M., Newhall, C.G., Blong, R., Wagner, J.-J., Munoz-Carmona, F., Tilling, R.I., Highland, L.M., Guzzetti, F., Sassa, K. (1997). Early warning capabilities for geological hazards. *Intern Decade Nat Disast Reduc*, Geneva.

Hestnes, E. 1998. Slushflow hazard – where, why and when? 25 years of experience with slushflow consulting and research. *Ann. Glaciol.* 26, 370-376.

Highland, L.M., and Bobrowsky, Peter, 2008, *The landslide handbook—A guide to understanding landslides*: Reston, Virginia, U.S. Geological Survey Circular 1325, 129 p. [C1325_508.pdf \(usgs.gov\)](https://pubs.usgs.gov/circular/c1325/508.pdf)

Huggel, C., Khabarov, N., Obersteiner, M., Ramírez, J.M. (2010). Implementation and integrated numerical modeling of a landslide early warning system: a pilot study in Colombia. *Nat. Hazards* 52, 501–518. <https://doi.org/10.1007/s11069-009-9393-0>.

Hungr, O., Leroueil, S., and Picarelli, L. (2014). The Varnes classification of landslide types, an update, *Landslides*, 11, 167–194, 2014. <https://doi.org/10.1007/s10346-013-0436-y>

Intrieri E., Carlá T, Gigli G. (2019). Forecasting the time of failure of landslides at slope-scale: A literature review. *Earth-Science Reviews*, Volume 193, June 2019, Pages 333-349. <https://doi.org/10.1016/j.earscirev.2019.03.019>

Krøgli K. I., Devoli G., Borsány P., Engeset R., Majala D. G. (2020). Effektiv kommunikasjon av naturfarevarsel fra NVE. Hvordan kan NVE best formidle naturfarevarsler? NVE report 21/2020 (in Norwegian). Norwegian water resources and energy directorate, Oslo, Norway. https://publikasjoner.nve.no/rapport/2020/rapport2020_21.pdf

Krøgli, I. K., Devoli, G., Colletuille, H., Boje, S., Sund, M., and Engen, I. K. (2018). The Norwegian forecasting and warning service for rainfall- and snowmelt-induced landslides, *Nat. Hazards Earth Syst. Sci.*, 18, 1427–1450, <https://doi.org/10.5194/nhess-18-1427-2018>, 2018.

LandAware - International network on LEWS
Working Group 1 – Catalog of LEWS

Medina-Cetina, Z., Nadim, F. (2008). Stochastic design of an early warning system. *Georisk*. 2, 223–236.
<https://doi.org/10.1080/17499510802086777>.

NOAA, 2022. Glossary -NOAA's National Weather Service. [Glossary - NOAA's National Weather Service](#) (last access: 21.05.2022).

NDMA (2009) National Disaster Management Guidelines—Management of Landslides and Snow Avalanches, 2009. A publication of the National Disaster Management Authority, Government of India. June 2009, New Delhi. [landslidessnowavalanches.pdf \(nidm.gov.in\)](#)

Opensnow.com (last access: 21.05.2022).

Oxford English Dictionary (last access: 21.05.2022).

Oxford Learner's English Dictionary (last access: 21.05.2022).

Park J-Y, Lee S-R, Lee D-H, Kim Y-T, Lee J-S (2019). A regional-scale landslide early warning methodology applying statistical and physically based approaches in sequence. *Engineering Geology*, vol. 6, <https://doi.org/10.1016/j.enggeo.2019.105193>

Pecoraro G., Calvello M., Piciullo L. (2019). Monitoring strategies for local landslide early warning systems. *Landslides* 16, 213-231 (2019). <https://doi.org/10.1007/s10346-018-1068-z>

Piciullo, L., Calvello, M., Cepeda, J.M. (2018). Territorial early warning systems for rainfall-induced landslides. *Earth-Sci. Rev.* 179, 228–247. <https://doi.org/10.1016/j.earscirev.2018.02.013>

Ramage, C.S. (1993). Forecasting in meteorology. *Bull. Am. Meteorol. Soc.* 74,1863–1871.
[https://doi.org/10.1175/1520-0477\(1993\)074<1863:FIM>2.0.CO;2](https://doi.org/10.1175/1520-0477(1993)074<1863:FIM>2.0.CO;2)

Reichenbach, P., Cardinali, M., De Vita, P., Guzzetti, F. (1998). Regional hydrological thresholds for landslides and floods in the Tiber River Basin (Central Italy). *Environ. Geol.* 35 (2-3), 146–159.
<https://doi.org/10.1007/s002540050301>.

Rossi, M., Guzzetti, F., Salvati, P., Donnini, M., Napolitano, E., & Bianchi, C. (2019). A predictive model of societal landslide risk in Italy. *Earth-Science Reviews*, 196, 102849.
<https://doi.org/10.1016/j.earscirev.2019.04.021>

Salvati, P., Bianchi, C., Rossi, M., Guzzetti, F. (2010). Societal landslide and flood risk in Italy. *Natural Hazards and Earth System Sciences*, 10, 465-483, <https://doi.org/10.5194/nhess-10-465-2010>

Seibold, E. (2003). Natural disasters and early warning. In: Zschau, J., Küppers, A. (Eds.), *Early Warning Systems for Natural Disaster Reduction*. Springer-Verlag, Berlin, Heidelberg, pp. 3–10.
https://doi.org/10.1007/978-3-642-55903-7_1

Segoni, S., Piciullo, L., and Gariano, S. L. (2018). A review of the recent literature on rainfall thresholds for landslide occurrence, *Landslides*, <https://doi.org/10.1007/s10346-018-0966-4>

Segoni, S., Rosi, A., Rossi, G., Catani, F., and Casagli, N. (2014). Analysing the relationship between rainfalls and landslides to define a mosaic of triggering thresholds for regional-scale warning systems, *Nat. Hazards Earth Syst. Sci.*, 14, 2637–2648, <https://doi.org/10.5194/nhess-14-2637-2014>, 2014.

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Working Group 1 – Catalog of LEWS

Smith K. (2013). Environmental Hazards. Assessing risk and reducing disaster. 6th Edition. Routledge, Taylor & Francis group (ed). London and New York.

Stähli, M., Sättele, M., Huggel, C., McArdell, B.W., Lehmann, P., Van Herwijnen, A., Berne, A., Schleiss, M., Ferrari, A., Kos, A., Or, D., Springman, S.M. (2015). Monitoring and prediction in early warning systems for rapid mass movements. *Nat. Hazards Earth Syst. Sci.* 15, 905–917. <https://doi.org/10.5194/nhess-15-905-2015>.

UNGA (2016). Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction. Note by the Secretary-General. United Nations General Assembly (UNGA). Document No. A/71/644. <https://undocs.org/A/71/644>

UNISDR (2006). Developing Early warning systems: a Checklist. In: Proc. of EWC III, Third International Conference on Early Warning, From Concept to Action, UN Secretariat of the International Strategy for Disaster Reduction (UN/ISDR). Bonn. 13pp. [Microsoft Word - English final new.doc \(unisdr.org\)](#) (last accessed 21.05.2022).

UNISDR (2009). Terminology on Disaster Risk Reduction, United Nations International Strategy for Disaster Reduction (UNISDR), Geneva, Switzerland, [7817 UNISDRTerminologyEnglish.pdf \(preventionweb.net\)](#) (last accessed 21.05.2022).

USGS, 2022. [What is the difference between a landslide advisory, a landslide watch, and a landslide warning? | U.S. Geological Survey \(usgs.gov\)](#) (last access: 21.05.2022).

WMO (2015). Guidelines on Multi-hazard Impact-based Forecast and Warning Services. (2015, WMO-No 1150), https://library.wmo.int/index.php?lvl=notice_display&id=17257#.W_PbjKIRdR4

White, I.D., Mottershead, D.N., Harrison, J.J. (1996). Environmental Systems, 2nd edition. Chapman & Hall, London 616pp.

Zschau, J., Küppers, A. (2003). Early Warning Systems for Natural Disaster Reduction. Springer-Verlag, Berlin, Heidelberg. <https://doi.org/10.1007/978-3-642-55903-7>