Massive movie waves and the anthropic ocean

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Abstract
This article examines representations of ocean waves in disaster and science fiction movies, reading these for what they can indicate about shifting ideological accounts of human–ocean relations. I track the technical conjuring of such on-screen waves – made using everything from scale model wave tanks to computer-generated imagery (CGI) – and explicate how these enable waves' narrative purposes and effects. I argue that towering waves in film have operated as emblems of (a) the elemental power of cosmic, inhuman, arbitrary forces, (b) the return of the social-environmental repressed, and (c) the power and limits of cinematic media themselves. The most recent fantastical waves, rendered digitally, I suggest, now generate reflexive usages that underwrite either optimistic aesthetics of a nature crafted in partnership with humanity or ironic pessimism about human enterprise in the face of looming ecological disaster.

Keywords
Anthropocene, animation, disaster, film, waves

Résumé
Cet article examine les représentations des vagues océaniques dans les films catastrophes et de science-fiction, afin d'appréhender les changements idéologiques inhérents aux relations Homme–océan. J'examine les aspects techniques de ces ondes océaniques à l'écran – du modèle réduit de réservoir à vagues à l'imagerie générée par ordinateur (3D) – et analyse les effets narratifs de ces dites-vagues. Je défends l'idée que les vagues imposantes dans le cinéma sont représentées comme des emblèmes (a) d'une puissance cosmique élémentaire, inhumaine, aux forces arbitraires, (b) du retour du refoulement social environnemental, et (c) du pouvoir et des limites intrinsèques des médias cinématographiques. Je suggère que les vagues fantastiques les plus récentes représentées

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digitalement engendrent maintenant des pratiques réflexives qui souscrivent soit à l'image d'un optimisme esthétique d'une nature revisitée en lien avec la compassion ou un pessimisme ironique relatif à l'entreprise humaine face à l'imminent désastre écologique.

Mots-clés
animation, Anthropocène, catastrophe, film, vagues

In 'Wave theory', in the pages of *Sight and Sound*, in 1996, screenwriter and film critic David Pirie suggested that Hollywood movie genres rise and fall in waves. Adapting theories of crowd psychology from the accountant Ralph Nelson Elliott, who in 1938 proposed a model of investor behaviour called the 'Elliott Wave Principle', Pirie observed that the genre of the disaster movie, which had fallen into a lull since its 1970s crest, was coming back, as film companies in the 1990s financed a new cycle of disaster movies banking on the arrival of new special effects techniques and on a surge of popular millennial, apocalyptic anxiety.

Here, I spin off from Pirie's claim in a literal-minded way, looking at changing representations of waves – ocean waves – in disaster and science fiction movies, mostly, though not exclusively, in American and European contexts, reading these for what they might tell us about dominant, if shifting, ideological accounts of human–ocean relations. Movies that feature colossal ocean waves have realized such forms through a range of special effects, from the use of material and mechanical scale models, to optical and photographic trickery, to computer-generated animations and simulations. I am interested in the technical conjuring of such on-screen waves – using everything from wave tanks to computer-created imagery – and in how these techniques enable waves' narrative purposes and effects. Movie waves are what film theorist Kristen Whissel would call an 'effects emblem': 'a cinematic visual effect that operates as a site of intense signification and gives stunning (and sometimes) allegorical expression to a film's key themes, anxieties, and conceptual obsessions' (2014: 6). The dramatic roles filmic waves have fulfilled, I suggest, have been multiple. Towering waves in film have operated, in shifting ratios and phases, as emblems of (a) the elemental power of cosmic, inhuman, arbitrary forces, (b) the return of the social-environmental repressed, with waves as moral messengers paying humanity back for sins against the orders of nature or social justice, and (c) the fantastic power and limits of cinematic media themselves.

The beginnings of waves in and on film are at once more empirical and humble than their later cinematic descendants – though, also, importantly paradigm-setting in their technical, formal, and epistemological entailments. Étienne Jules Marey, the 19th-century physiologist and originator of 'chronophotography', famous for his 12-frame-per-second studies of the movements of birds, cats, fish, and other animals, in 1891 made *La Vague*, an under-a-minute film of a wave crashing into a clutch of rocks in the bay of Naples (Figure 1).

Marey's purpose was documentary, a step-by-step study of movement, putting into motion a series of snapshots, extending the sort of experiments realized by Eadweard

Figure 1. Sequence from Étienne Jules Marey, *La Vague*, 1891.

Muybridge in Palo Alto in the late 1870s, in which Muybridge famously generated a series of stills taken in quick succession to capture the movement of horses.[1] It became imaginable to slice *time* up into framed visualizations and to then suture these together in *space* – parcelling them out along segmented linear spans of nitrate, celluloid, acetate and other film stock. It also became possible to watch things over and over again, to slow, to pause, to reverse (see Gunning, 1989: 33 on early silent film as 'a cinema of instants, rather than developing situations', a condition that online formats such as GIFs may be reactivating, as I discuss below).

As philosopher Henri Bergson – a colleague of Marey's at the College de France in the early 20th-century – noted, in chronophotography, the time of *experience*, or what Bergson called 'duration' came newly to be captured and expressed as space: 'The terms that designate time', he wrote, 'are borrowed from the language of space' (Bergson, 1946: 4; as in the sequence above, which, read left to right, means to mimic temporal succession). The result, for Bergson, was that, 'instead of attaching ourselves to the inner becoming of things, we place ourselves outside them in order to recompose their becoming artificially' (Bergson, 1911[1907]: 332). The wave, taken as a visible, surface object, is portioned into instants and reassembled in the space–time of the viewer, who comes to see the wave-movement-image as at once an empirical record and a lively phenomenon, one that may support various characterizations and narrative uses (cf. Kelty & Landecker, 2004 on life, animation and film).

Gilles Deleuze, in *Cinema 1: The Movement Image* (1986) and *Cinema 2: The Time Image* (1989), draws on Bergson, and, reading films from the 20th century, complicates this view, arguing that, with film, movement comes to be inscribed *within* the still. In the mostly later 20th-century films I treat here, waves are *movement-images* and *time-images par excellence*, for their pitched present always points to their immediate past (their swelling arrival) and their immanent future (their just-about-to-breakness).[2] More, the time they gather up is not simply linear, unfolding time, nor only the subjective or interior time of a viewer, but also a time of fantasy, of the 'unthought, the unsummonable, the inexplicable, the undecidable, the incommensurable' (Deleuze, 1989: 214; and also

Voss, 2013). Techniques of computer-generated imagery (CGI) and digital cinema, which have come into use in the last 30 years or so – and which have become essential to making disaster waves in movies – have extended the parameters of fantasy imaging (and have jumped away from the material of 'film'), but also largely hew to what Stephen Prince early on (1996) called 'perceptual realism', though have also amplified the possibility of creating physically impossible points of view, human and nonhuman, as well as camera-eye travels across widely varied scales (see Whissel, 2014). These impossible views, I suggest at this article's end, have lately generated reflexive, even ironic, usages.

The elemental, cosmic, inhuman, and arbitrary wave

Begin with a canonically 1970s disaster movie, *Tidal Wave*, from 1973, which has many of the requisite features of disaster movies from this period: an astoundingly out-of-scale elemental disaster, a set of people who are variously trying to save everyone, save themselves, sacrifice themselves, or struggle against or submit to their fate (see Casper, 2011; Kaye 2017; Keane, 2006). The poster for this movie freezes a movement-image that speaks of momentum, threat and imminent danger (see Figure 2).

Tidal Wave belongs to a lineage of films that pose waves as inhuman, as massive unthinking intensities that test or snap human hardiness, or that demand that people band together across social divisions thrown into disarray by disaster.[3] Close on the heels of *Tidal Wave* came *Meteor*, in 1979. In both films, the challenge for filmmakers was to create a large wave that looked realistic, and in each case, the challenge was met with a combination of large splashings of water onto actors, miniature scale models of city-scapes inundated with water, and double exposures that superimposed actors against footage of onrushing waves (see Figure 3).

Making this all come together was difficult. The use of real water in scaled-down city models came widely to be regarded as looking fake; water, hydrologists report, does not scale well or convincingly (see Newman, 1977). This is because the molecular structure of water and the force of gravity are not themselves scalable in such models – and trying to correct for this, as Hollywood films have, by slowing down the action (taking more frames per second) cannot work well since not all the processes in play scale at the same *rate*. What becomes jarring about large wave images like the one in Figure 3, from *Meteor*, is a sense not only of their material and spatial clumsiness, but also a sense that human *time* and wave *time* are not in their on-screen presence calibrated to one another. For a large wave to be convincing, it must exist, with humans, in the same filmic, scalar and narrative time. As Melody Jue writes in her analysis of computer models of ocean water, 'seawater's materiality changes with scale' (2014: 247). So it is too with and on film.[4]

Grappling with matters of scale in depicting fantastically monstrous ocean waves has been aided by the rise of computer graphics and animation, which permit filmmakers to fuse filmic and computational materials in composite images, which bring different orders of magnitude into the same frame (though see Davis, 2014). Even as filmmakers can avail themselves of physics simulations that render water surfaces with mathematical exactitude, though, they are also able to leave some properties of material water behind, to indulge their and their viewers' imaginations of what a wave *could* look like.[5] In this
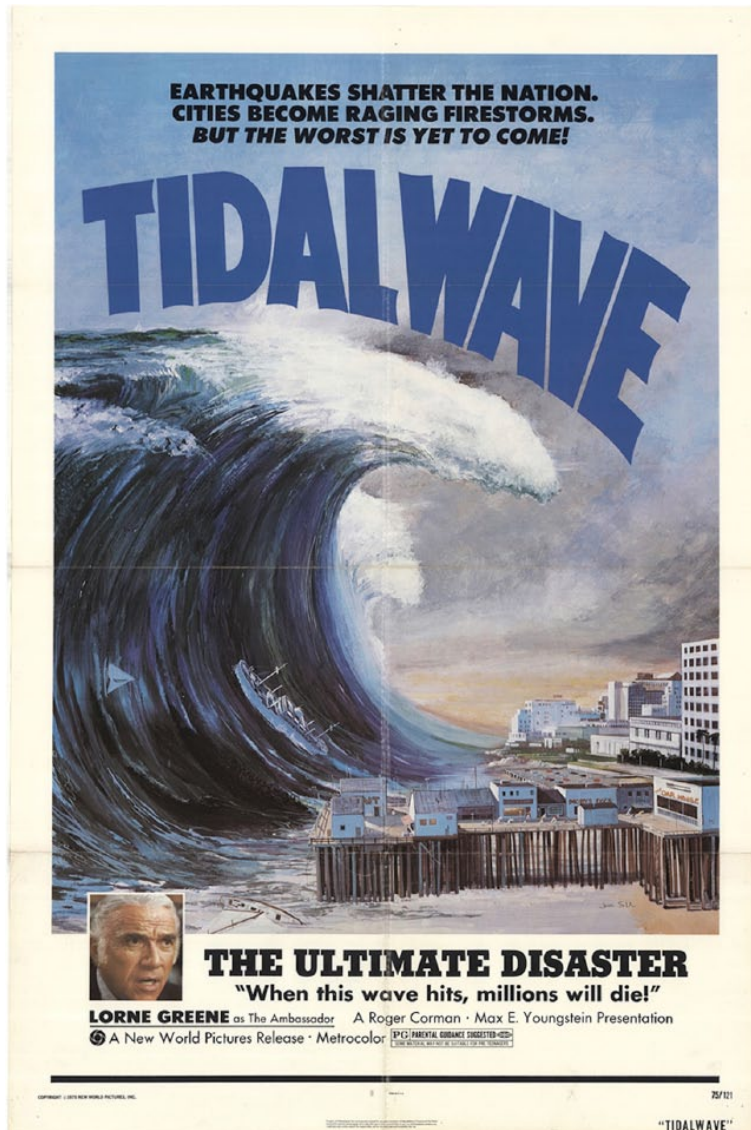
Figure 2. Poster for *Tidal Wave*, 1975 (US version of 日本沈没, from 1973).

way, as Mark Hansen (2004) has argued about the digital image, the virtual can be layered onto/into the actual.

So, take as a more recent example of the unreasonably immense wave the mammoth comet-impact-generated wave that strikes New York City in 1998's *Deep Impact*. In one of the most widely reproduced stills from this movie, the wave is represented as at once a brute fact, a terrifying and unyielding character, and as a force of action, joining together what Deleuze would call the perception-, affect-, and action-image (see Figure 4). The effect is utterly fantastical, though also, to use Prince's term, inserted into a regime

Figure 3.

Figure 4.

of 'percep   ble) lighting,
colouring   pears. In the
face of th   away or, in
moments of steely resolve or stoic surrender, submit to its immensity. These scenes of
humans, singly and in multiple, turn out, upon repeated viewings, actually to govern the
speed of the wave in the movie, since the wave must move in calibration and synchrony
with required narrative elements – the registration of disbelief on people's faces, tender
goodbyes, last-minute heroics. The sound design underscores this as well, as anxious
string music guides the viewer/listener into the sweep of the drama.[6]

What to make of the gargantuan wave of the 2014 movie *Interstellar*, which appears
when astronauts arrive on an ocean planet and realize that that world comes outfitted
with 4,000-foot waves? The wave in the film, as visual effects supervisor Paul Franklin
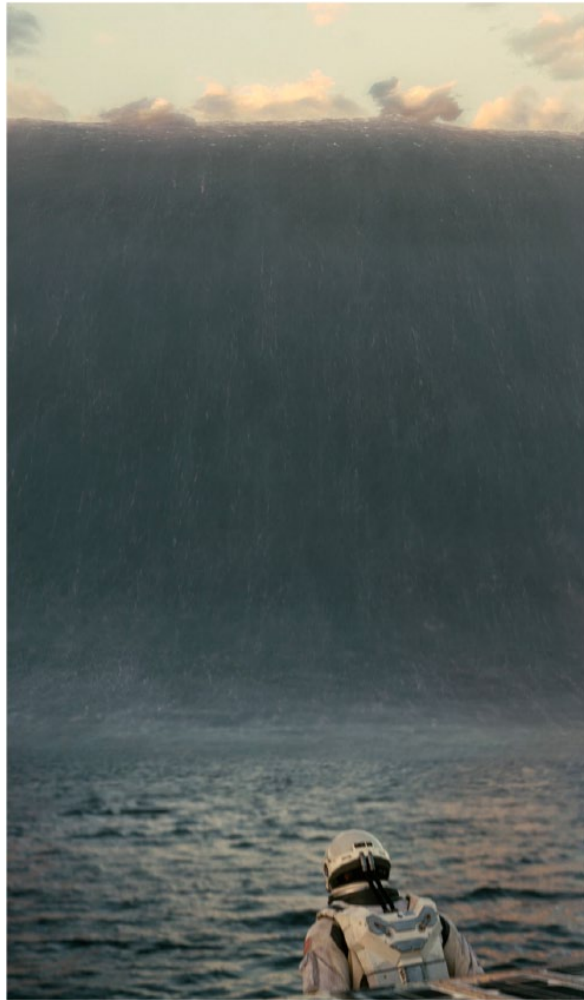has reported, was:

Figure 5. Still from *Interstellar*, 2014.

a combination of very, very detailed, rigorous simulation of what water should actually do using physics simulations to work out how do the waves splash and sweep the spacecraft away, and how does the water surge over the hull of the spacecraft. And that was a quite tricky thing to do, was to work out what would be the surface details that would tell you this thing is 4,000 feet high. And of course this all then had to be integrated seamlessly into the photography that we'd done on the location. (Franklin, in DVD extra on *Interstellar* DVD)

What is obvious is this: this wave is a narrative force. But it is more than this. In one of the more remarkable still images circulated in connection with the film, we see the wave as a sublime agent bearing toward an individual whose character, we imagine, will be tested by its arrival (see Figure 5). Indeed, the wave itself becomes a *character*, and the special effects people approached it as such. Franklin, again:

> When you get to something that's 4,000 feet high, water behaves in a very different way – you don't get those curling breakers on top, for one thing. So we actually treated the waves as though they were animated characters – our animators who usually work on digital creatures animated the wave itself. (quoted in Hawkes, 2014)

This accounting makes it clear that waves are *always* characters in movies. And part of their character description is that they exist at their particular scale – a scale that dwarfs human action, individual and collective.[7]

We can understand waves on the screen, too, through the *formal* qualities they exhibit, qualities that motivate how the audience is meant to experience the spectacle of their unfolding. In *The Forms of the Affects*, Eugenie Brinkema (2014) argues that the formal aspects of filmic composition *create* affect, not just package it. A digression here into her reading of *Open Water*, a film about a pair of scuba divers accidentally abandoned by their boat and eventually (spoiler alert) eaten by sharks, guides my next point. Brinkema suggests that the out-of-placeness of humans in *Open Water* can be read from what happens to the line of the horizon over the course of the film. The clean line is broken, first, by a shark fin and then, second, by one of the divers using her mask to look down into the deep, into what will turn out to be her grave. After the first appearance of a shark, Brinkema writes:

> a wave flows over the camera lens, and the film for the first time since the couple has risen to the surface dips below the level of the water … Although an ontological break in the sea surface line has been signaled in the appearance of the fin that rips through it, the breach's more radical form involves the camera dipping underwater in an unattributable shot, an image completely delinked from even an approximation of a character's (limited, partial) vision. (Brinkema, 2014: 228)

Though abundantly more chaotic in form, in the 2015 disaster film *San Andreas*, which features an immense wave coming to wipe out much of California, we have a similar moment when the wave, arriving into San Francisco's Chinatown with a large cruise ship on its crest, plunges the 'camera' underwater (see Figure 6, which offers a street-level view at the moment just before the audience's vantage point is pushed underwater) (and see Jones, 2007; Pierson, 2015).[8] Though there is a fantastical perceptual realism at play here, it is clear that we have left the analogical or indexical promise of old-fashioned film. These cannot be images that are 'direct and isomorphic transcriptions of a moment that existed concurrently with the camera' (Hadjioannou, 2008; see also Mangolte, 2003). Digital cinema no longer offers a *record* of time, but rather generates a *simulation* of time. And the fluid transition across air and underwater media is an illusion, one from the age of digital cinema, 'defined by spatial and temporal continuity and by a rejection of the cut' (Brown, 2013: 9). Even so, this moment belongs, still, to the order of the movement-image. As William Brown explains about the possibility for digital filmic representation to skip scales and pass through materialities, in such films:

> the (virtual) 'camera' passes through 'filled' space (i.e., solid objects) with the same ease with which it passes through 'empty' space. By showing space and all that fills it as a single continuum, as opposed to a space fragmented by objects, digital technology suggests the inherently connected nature of those objects and their surroundings (Brown, 2013: 1).

Figure

More, 'characters in digital cinema no longer stand out as unique agents against the space that surrounds them, but instead become inseparable from their space' (Brown, 2013: 2). Humans and waves can become similar sorts of filmic characters (Figure 6), with the first-person drowning image in *San Andreas* simply another character move – and even a kind of nostalgic reference to the now quaint conceit of the human-controlled camera (*Geostorm*, from 2017, even offers one of its colossal waves from the imagined point of view of a surfer in the barrel of a gargantuan, inhuman tube). As Lev Manovich argues, 'the relationship between animation and film has been reversed following the advent of digital technology, such that if animation was once a subset of cinema, live action analog film is now the subset' (Brown, 2013, paraphrasing Manovich, 2001: 302).

Filmic recreations of recent *real* tsunamis, as in 2010's *Hereafter* and 2012's *The Impossible*, both of which tell tales of people surviving the Indian Ocean tsunami of 2004, and both of which seek a certain verisimilitude, retain an accounting of waves as inhuman energies, script their tales of human resilience by placing individual persons at the centre of their stories. In each of these Euro-American productions, these are not just any people; they are white European families caught up in a disaster that, even as it is arbitrary, is coded in its outlines as that which more usually befalls the struggling thousands of the third world (in the stills reproduced here, individual, fleeing white bodies are staged against settings that suggest tropical vacations gone wrong: monsoon-ready balconies, palm trees (Figures 7 and 8)). European families, their lot thrown in with local bodies, survive only by luck and wits that are meant to be coded as universal, even as their narrative work is accomplished by staging them as bodies out of their usual geographical place and daily time (see Ghosh, 2016 on the tension between disaster stories and the form of bourgeois narrative, which assumes a regular day-to-day cadence).[9]

The technical details behind the on-screen waves in *Hereafter* and *The Impossible* are diagnostic of what the films aspire to do: to get humans and disastrous waves into something like the same scale. Here, however, older techniques of using real water return (Failes, 2010), since we are not meant here to see aggregate humanity (which – with nearly 250,000 people perishing in the 2004 tsunami – was certainly one scale at which the event *happened*, and not so much in the concentrated urban spaces that disaster movies seem to favour). For *The Impossible*, director Juan Antonio Bayona 'recreated the tsunami with a mixture of digital effects and real water surges':

Figure 7. Still from *Hereafter*, 2010.

Figure 8. Still from *The Impossible*, 2012.

> 'We created miniatures that were destroyed by a huge wave that we created in a water tank in Spain', he says. The Spanish director admits it was 'crazy' to commit to working with real water rather than a computer-generated wave, but he wanted the story to be authentic. This meant Naomi Watts and Tom Holland, who play mother and son Maria and Lucas, were gulping water in a massive water tank for five weeks (Curtis, 2012)

The effect of a tsunami arriving at a hotel resort was accomplished using real pumps and dumps of water (see Ocean Innovations, 2015). Tanks of water were loosed on actors on set. Actors filmed scenes in swimming pools, which were then composited onto larger settings. A one-half scale model of a hotel was created and inundated with thousands of litres of water. But digital effects were in use, too – for example, there is a change in point of view, from 'objective' to camera-subjective after the wave arrives; the screen goes blank and then an image re-emerges, of underwater confusion, complete with muted bubble sounds. In *Hereafter*, much was achieved through compositing images of real water with CGI. In some cases, even the actors had computer-generated features added to them. Again, waves and people, both become animated effects, tuned to act in the same temporal world.[10]

Waves as moral messengers, or missives from the Anth...

Bringi... ...plicitly
human ...s, and
a good ...moral
device ...is to a
localiz ...fjord
monito ...which
townsp ...nd the
precari ...haotic
form b ...ng the
human ...*eafter*
and *The Impossible*, in which moral journeys begin *after* a disastrous wave hits, in films like *The Wave*, the wave offers a climactic culmination, a moral lesson that puts human characters' failures to act into relief.[11]

Waves as a narrative climax for stories of human foolishness also appear at the global, geopolitical scale. The biblical narrative of Noah and the flood is almost always an obvious echo. A canonical movie here is *The Day After Tomorrow*, from 2004, which features a climate-change created wave that hits New York.

The wave in *The Day After Tomorrow* arrives as a mix of a wave and a slumping flood (see Figure 10), a mixture of the realistic and the fantastical, an apparition of a disordering sublime. It is still, of course, calibrated to individually scaled human narratives. That becomes obvious when the wave's motion is out of view and we see individual characters outrunning waters that, moments ago, were about to engulf them. Physics and hydrodynamics are subordinated to narrative – even as an ethos of perceptual realism formats how we are supposed to track the story's action. The wave-image here is still a *movement-image*: always implicitly, inexorably in motion. We viewers know that waves do not and cannot stand still. We know that gravity cannot suspend things forever, and so waves suspended on the screen represent a kind of still moment before a torrent; their sublimity and threat is in their imminent collapse.

There is a larger message at work in *The Day After Tomorrow*. In this film, we viewers are pressed to see our todays and tomorrows as themselves moments of suspension before a fully realized, climate-change-induced flooding Anthropocene. The wave of *The Day After Tomorrow* is anthropocenic – *anthropoceanic*. It has 'the human' and the sins of humanity inside of it – and not just any humanity, as it happens, but the humanity of the global industrialized North, as, at the end of the film, the President of the United States confesses that climate change has come about because of overconsumption from overdeveloped countries, who must now, humbled, turn to the (less-hard hit) global South for succour and support (see Keane, 2006; Rust, 2013). This wave, then, is a character that embodies a return of the repressed to an assumed Northern viewer. Following Whissel, we can say that wave fits in the category of 'effects emblems [that] are deployed to give a spectacular representation to scenarios and events that strongly imply, or threaten to bring about, 'the End' (Whissel, 2014: 18) – 'the end of freedom, the end of a civilization, the end of an era, or even the end of human time altogether' (Whissel, 2014: 60).[12] The wave of *The Day After Tomorrow* is a force that is devastating, but also ground clearing, signalling
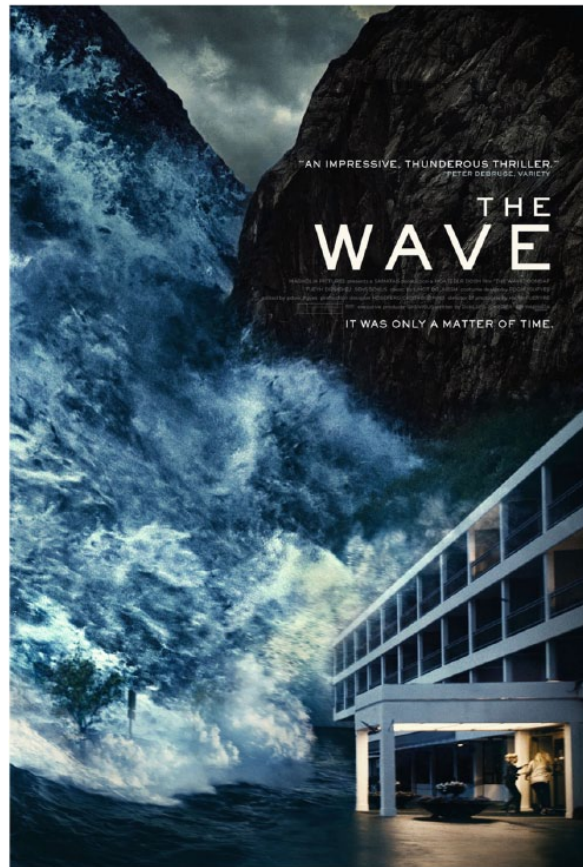
Figure 9. English language poster for *The Wave (Bølgen)*, 2015.

Figure 10. Still from *The Day After Tomorrow*, 2004.

the beginning of a new era – though also a pessimistically Northern one, since, in the real world, low lying ... of sea level and the incursion of wave ...

An[...] in the
Earth's[...] tastro-
phe, in[...] viliza-
tion's[...] Mayan
Long [...] mind-
ful of [...] House
falls u[...] human
techno[...] nce in
the fac[...]

In r[...] - spec-
tacula[...] culture
inunda[...]

Killer Wave, from 2007, makes the notion of a human-made wave literal. In this movie, the wave is not simply the effect of human (in)action, but is deliberately *created* by the villains of the film, who hope to cash in on construction contracts for rebuilding destroyed cities (one might even think of the waves of zombies that one sees in *World War Z*, the aggregate embodiment of human foolishness; see Whissel, 2014).[14] (It is also worth noting that the publicity image on the DVD case for *Killer Wave* – see Figure 12 – echoes Hokusai's famous 1829 woodblock print, *Great Wave off Kanagawa* (something we can also say of Figures 2, 4, 9 and 11). Both the print and the poster show a monstrous wave coming in from the left, placing human vehicles in peril – a fisherman's boat in the print, an upturned car in the poster). *Geostorm* (2017) speculates about what might happen if technical attempts to control the world's weather fall into evil hands; the film shows Dubai destroyed by a massive wave.

The moral message of ocean waves, coming to sweep the Earth clean, does not, as in *The Day After Tomorrow*, always need a scientific, climate-change driven warrant. That is the case in big wave disaster movies for people who do not accept climate change – or who look to fundamentalist religion for their eschatology. *2012: Doomsday*, for example, a Christian rapture film (Everhart, 2008), features in its poster advertising a large wave coming to inundate a city. Resonances with the Noachian flood are thick. *San Andreas* might even be interpreted as a cosmologically agnostic disaster film, open to religious interpretation (with San Francisco as Sodom and Gomorrah?). We might read the form of the disaster in that movie – in which cruise ships fly through the air, container ships fracture bridges – as shorthanding human transgression of the sea, as the ocean punishing sea-borne 'globalization'. Indeed, the becoming-vertical of the social world is key. Whissel writes that:

> As an effects emblem, verticality creates an interpretative framework for … rising and falling bodies and matter in these films that goes well beyond their reality effect: by mapping complex struggles for power onto the laws of physics, verticality can make historical change a matter of inertia or inevitability (Whissel, 2014: 30).

'Gravity', she writes, 'acts as a historical corrective' (2014: 32; as it does in *Titanic*, when the order of things, rich at the top, poor at the bottom, become subject to the levelling force of physics). If the world of film gives us narratives that are 'the recognition of
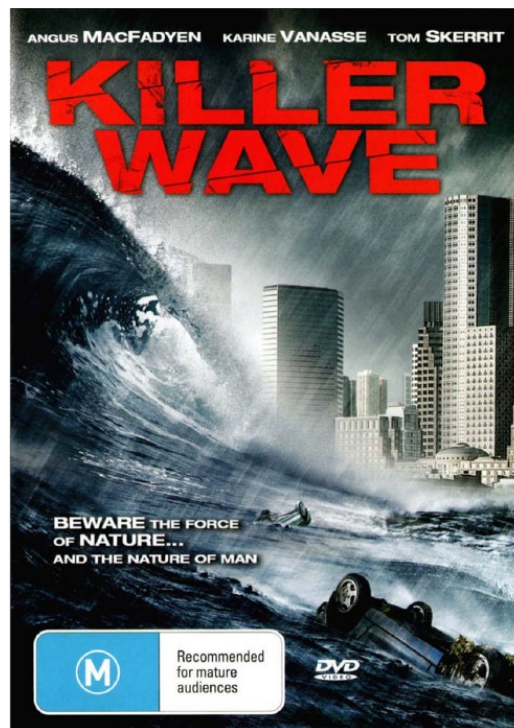
Figure 11. Poster

Figure 12. DVD cover for *Killer Wave*, 2007.

Figure 13. Poster for *Tidal Wave* (해운대), 2009.

a temporal-sequential or "horizontal" connection across shots or scenes' (Ivakhiv, 2013: 89), the verticality created by large waves signals a world turned sideways.

   Tidal Wave (해운대) from South Korea, 2009, was publicized with a poster (see Figure 13) emphasizing just this verticality, just this threat of sidewaysness (compare Figures 5, 9 and 11, which operate similarly). The film brings together reality, fiction and a moral journey (this film steps away a bit from perceptual realism, or at least toys with it. At one moment, with people running from the wave, the film action stutters, slowing down and speeding up). In this film (whose Korean title is the name of the beach the wave hits), the main character feels guilty for not having been able to save a friend from the 2004 tsunami. Back in South Korea, the wave that hits Busan is a moral test. As Clare Kim (personal communication, 7 December 2017) suggests:

> The impending wave compels individuals and collectives like the local fishermen to work together for survival. Whereas the fishermen rely on their own resources to protect each other, the wave sweeps away the greedy antagonists who earlier threatened the fishermen's livelihoods with foreign-investment-backed development projects. The wave appears as a positive force that preserves and secures an imagined set of Korean traditional values.
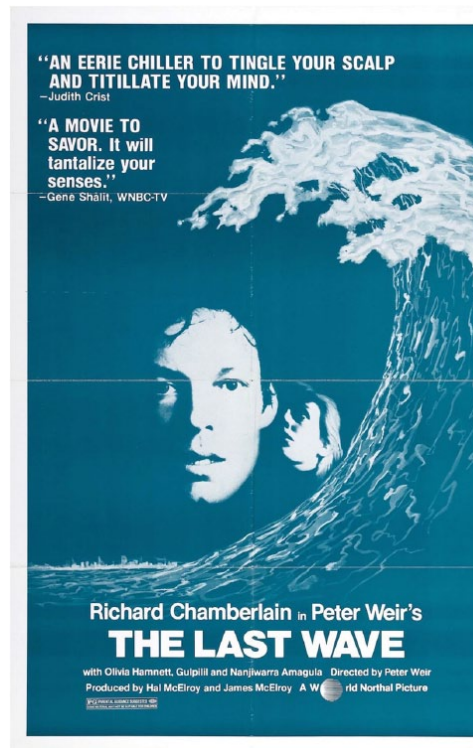
Figure 14. Poster

Waves in disas... a genre of movie I have not really trea... rf action movie.[15]). Large waves hold ... e consequences of their lack of fores... ut the cumulative consequences of th... d of the structures of *slow violence* (N...

Such moral mes... *Wave*, a 1977 film by Peter Weir, ab... boriginal men in Australian court (n... *...ller Wave* visually quotes Hokusai's ... ymbolisms of disaster, rushing hist... As the lawyer is drawn into the wor... erhaps even sees, opaquely (it might... s wave coming to wipe out Australia... troy human enterprise, but also the ... return to the colonial power of the r... epresented than in the other films I have treated here. Taking a page from Deleuze's *Cinema 2: The Time Image* (1989), which discusses images that are made to reflect on time itself – images of memories, dreams, fantasies – we can understand the wave of *The Last Wave*, which never arrives, but is only hinted at by foreshadowings on cave paintings, in the agitated state of the white lawyer, as a meditation on time, and the time of colonial and postcolonial history, which is never really post.
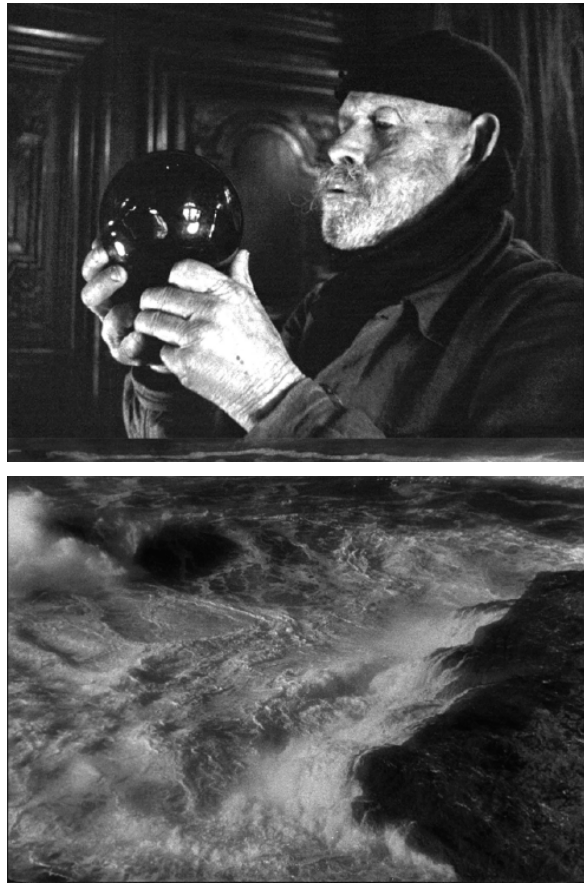
Figure 15. Stills fr[...]

The suspende[...] [...]e reflexive cine[...]

Cinematic play w[...] [...]e, fantastical, and ironic representati[...] [...]stein's 1947 film, *Le Tempestaire*. In[...] [...]e or storm-tamer – is able to control a[...] [...]ny. We see this old man cradling a cr[...] [...]waves (Figure 15, top). He blows at/[...] [...]slowing and, eventually, reversing (Figure 15, bottom) (see Keller and Paul, 2012). The old man is, of course, cinema itself – viewing from far, from up close, speeding up, slowing down, reversing.

This effect has a descendant – a mutated, digital one – in the 1989 science fiction film *The Abyss*. In this movie, extraterrestrial visitors to Earth who are capable of sculpting

Figure 16. Still from *The Abyss*, 1989.

water (and whose spaceship lands and lurks underwater) create and manipulate large ocean waves in order to threaten humanity. The waves are creations of alien technology, aimed at punishing humanity for its inability to live in reason and peace. As with films like *The Day After Tomorrow*, waves operate as moral messengers, as tools of ethical discipline. As it happens, the aliens eventually call the waves off, unrolling them backwards in space (which looks like time), like the *Tempestaire* (see Figure 16, a still of that moment in *The Abyss* when the wave stays *still*, hovering above a beach of confused tourists, who, as doubles for the audience, do not know whether to be frightened or amazed, whether to see the wave as an effect of the real or of the reel). Like their wavy ancestor in Marey's 1891 *La Vague*, they run forwards and back because of the phenomenotechnique of frame-by-frame film – even as the waves themselves are the result of computer animation, the layering of the virtual on the actual. The waves therefore also become avatars of digital filmmaking itself; where Epstein's mystical waves are all about the play of light and celluloid, these digital waves are about the rise of computer graphics, coming to sweep the techniques of older cinema away, as well as, perhaps, the figure of 'the human' as the organizing author of film. In *The Abyss*, humans are clearly imagined by the aliens as *children* in want of instruction – just as, perhaps, the audiences of the film need to be shown how to see anew.

Which brings me to children's films, in which the potential disastrousness of waves can be stayed, suspended, even tamed. Take Hayao Miyazaki's *Ponyo*, the story of a fish that becomes a human. In this film, waves phase in and out of being living whale-and-fish-like things and being water – and so, as above, they are animate, even tranimate (see Helmreich, 2017) characters (see Figure 17, in which this becomes particularly explicit; the wave has eyes). They are torrential forces of nature that might nonetheless live alongside humans, if only humans can tune back into oceanic nature in the way that the fish-child-of-the-sea Ponyo does. Children, the lesson seems to be, can work *with* waves (and, indeed, in *Ponyo*, only children see waves as they really are, as animate forces of nature).

Animation in an older-fashioned sense – as cartoons for children – is where this sort of narrative thrives. *Moana* from 2016 is another example. In this movie, we can read waves as the animate arms/faces of the ocean, as in one early scene during which a wave hovers kindly over the protagonist, offering friendship and perhaps even shelter

Figure 17. Still from

 Figure 18. Still from *Moana*, 2016.

(Figure 18). Waves in *Moana* defy gravity and suspend their own crashing. The wonder of the child protagonist, and of we viewers, places the wave outside time, history.[16] If the wave of *The Day After Tomorrow* is a punishing anthropoceanic wave, *Moana*'s wave is the promise of tuning back into the sea, a kinder, more harmonious anthropocean, anthropomorphized.

Adrienne Lafrance (2017) reports that

Disney's effects specialists and animators were constantly navigating the tension between wanting the water to look and move like actual water—but to be magical at the same time. 'That was a big challenge,' said Sandy. 'They would animate the ocean as almost a sock puppet, and we would take that and fill it full of bubbles and liquid or we'd do a simulation over it and make it further water to make it look more watery'.

Think of *Moana*'s wave alongside Kelly Slater's Surf Ranch in Lemoore, California, where, as of 2017, artificial waves are being generated in an inland pool so that surfers can surf a 'perfect' wave each time (Minsberg, 2017); these are tamed waves that speak

Figure 19. Still from *Infinite Now*, 2017, with play icon visible. From http://armanddijcks.com/cinemagraphs-waves.

to a fa[...]e opti-
mism, [...]t now
saturat[...]rising
seas?).[...]

An[...]ulpting
might [...]enre of
the *ci*[...]rapher
Ray C[...]ed by
tightly[...]ebsite
(http:/[...]nema-
graphs[...], upon
closer [...]ked in
a kind[...]

Such cinemagraphs in some ways return the viewer to the early days of silent film, to what Gunning (1989) called 'a cinema of instants, rather than developing situations'. The effect of Dijcks and Collins's cinemagraphs is an arrested sublime.

Importantly, we depart the movie theatre here – as the most interesting filmic treatments of waves now move to personal computer screens rather than unfolding in houses of public cinematic spectacle. Think of cinemagraphs as high-culture GIFs, those looping images made using the Graphics Interchange Format that appear all over the Internet as icons of ironic or knowing commentary. In 'The Digital Gesture', Hampus Hagman (2012) argues that GIF loops of either iconic or minor moments in movies (think of loops from scenes in *Star Wars, Lord of the Rings*) may re-enact 'early cinema, or even proto-cinema: they are silent, they are viewed in private … and they run on a loop'. He adds, though, that, because they are sharable, they have come to be an online gestural vocabulary, repurposed and even subverted across contexts (see also Viral Art, 2016). Most gestural GIFs feature people or animated animals in looped activity and invite readings of such activity, variously, as absurdly staged or full of hidden and hilarious meaning. They are elaborated emoticons. GIFs of massive waves from movies provide a different

effect (e.g., *The Day After Tomorrow*: https://giphy.com/gifs/tsunami-TmAKxgSx-f4Ahy). The implication is satiric, making fun of the excess of disaster movies by reducing them to flip-book trivia, to a trivality explored by tiny screens on which GIFs are often played. How such effects might map over to GIFs of real tsunamis – such as the 2011 *Tōhoku* event in Japan – is not immediately clear. These are waves domesticated – signs either of a desired taming of the sea or of denial about the magnitude of the changes that may be upon the coasts of the world. Caroline Jones (personal communication, 15 May 2018) calls these 'Anthropocene GIFs', and suggests that they 'perform the wobbling border between horror and comedy'.

Cinema waves have long been presented with a certain knowing reflexivity about the fact that they are animated by the filmic or digital medium that presents them. They might even be understood as representing the power and limits of cinema as such. Waves are present at the origins of cinema and seem to change form at crisis moments in the history of the medium. As film is challenged by television, filmmakers (in the 1960s, and more intensively in the 1970s) turn to large-scale special effects, epic stories for the screen, disaster movies. As film is challenged by digital technologies (games, the Internet), waves are again reinvented, now as virtual simulated objects capturing a slice of the digital, emblems of the sublime power of cinema as fantasy (to date, it does not seem as through 3D representations have significantly altered wave movement-images, though it seems that they should – maybe they will soon?). Nowadays, we may have entered a hyper-reflexive moment, when the artifactuality of waves on the screen has become a recursive resource for narrative, either animating an optimistic aesthetic of nature crafted in partnership with humanity (*Moana*) or underwriting an ironic sense of representation as inadequate to the politics of nature, captive to human folly in ways that cannot pretend to attach to meaningful ecological action, and that may spell human doom.

Companion Movie Montage

For a montage of scenes from movies featuring massive movie waves — a montage that delivers an argument about common tropes and effects — see "Massive Movie Waves Mix," by Jeremie Brugidou, available at http://vimeo.com/269392249

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Notes

1. As Jonathan Crary observes in *Suspensions of Perception*, Marey's work enacted a 'reciprocal operation of decomposition and reunification: his analysis of movement, within the frame of a single visual field, preserved a vector of spatial and temporal coherence, giving movement a *new form* of legibility and rationality' (Crary, 2001:140).

2. Deleuze (1986) suggests that perception, affect and action write themselves into film through such techniques as *the long shot* (establishing scenes), *the close up* (registering emotion), and *the medium shot* (tracking action). All are present in wave films, as waves are things seen from far away, up close (often registered in the faces of those actors meant to be gaping at waves as they arrive), and all along their unfolding.

    Compare waves as movement- and time-images to *fire*. In the 1940s, director Sergei Eisenstein (1986) posited the flickering flame as an allegory for the captivating power of cinema (and compare Wollen (1984) on cinema as fire and photography as ice). Leslie (2017) has recently written of clouds as cinematic motifs and how these have been enlivened in both analog and digital film.

3. The original Japanese version of the film was called *Japan Sinks* (1973) (日本沈没) by Shiro Moritani. Retitling, reshuffling, revising, and redistributing the film as *Tidal Wave* (Meyer, 1975) makes it much more about the wave than about anything specific to Japan. A 2006 Japanese remake of *Japan Sinks* by Shinji Higuchi was followed by a parody version, also from 2006, called *Everything Other than Japan Sinks* (日本以外全部沈没), directed by Minoru Kawasaki. Thanks to Clare Kim for the leads.

4. *Tidal Wave: No Escape*, a TV movie from 1997, made well after the moment when computer graphics were available, looks particularly off. The film cuts between actors and film of an onrushing wave (filmed on what looks like a different day, with different weather) that is clearly a normally sized beach wave massively slowed down. To make matters more comical, the wave is forever on the verge of crashing, arriving, like the person that is endlessly running toward the camera in Monty Python's *Holy Grail* (https://www.youtube.com/watch?v=fFufoOgCMW8).

5. 'As Vivian Sobchack has argued, the digital morph exploits the computer-generated image's relative liberation from some of the laws of physics to which the photographic film image is subject in order to transcend the fixed categories and oppositions that define our experience of the world, such as animate and inanimate, alive and dead, male and female, human and machine' (Whissel, 2014: 132; and see Sobchack, 2000).

6. Stephen Rust (2013) notes that the storm in *The Day After Tomorrow* has its own two-note musical leitmotif. For a key data point for calibrating movie, music and waves, see Hoffman and Vorkapich's 1941 *Moods of the Sea*, set to Mendelssohn's Hebrides Overture.

    If disaster movies are not only dark wish-fulfillment entertainments, but also foreshadowing dread stories of the (im)possible, the fact that the Twin Towers come down with *Deep Impact*'s wave offers an eerie premonition of their eventual collapse.

7. In *Interstellar* there is another wrinkle, which is that, in the story, on the ocean wave planet, time passes by at a different rate than on far away Earth, with each hour equal to seven Earth years (and see Stern, 2014).

8. Nicole Starosielski (2013) has suggested that underwater films in the 1950s portray the deep as a monstrous realm and then in the 1960s move to narratives about the sea as a place to colonize or inhabit. Waves here operate as surfaces separating worlds; with disaster movies, waves churn and confuse the realms of above and below.

9. This claim may require fine-tuning. Compare *Hereafter* and *The Impossible* to Indian disaster films that treat the tsunami or other wave-led floods. Prabhu Solomon's (2014) *Kayal* is a Tamil romantic drama that features the tsunami as a backdrop. Like *Hereafter* and *The Impossible*, it also centers on individuals separated and then miraculously reunited (though it was critiqued in *The Times of India* for 'cashing in on memories of a tragedy, possibly risking being exploitative [,] as the tragedy that followed hardly registers on screen' (Suganth, 2016)). *Tum Mile* is a 2009 Hindi romance directed by Kunal Deshmukh that takes place among the 2005 Mumbai floods, which operate actually and allegorically as a turbulent trial for a star-crossed couple. *Kathantara* (2007) is an Oriya film about the aftermath of the 1999 Odisha cyclone. The events around the 2011 *Tōhoku* tsunami in Japan have only started entering into fiction film (documentaries are already many), and most (see Sion Sono's 2012 *Land of Hope* (希望の国)) focus on Fukushima and its aftermath rather than the wave that initiated the catastrophe (see Schilling, 2013). There have been a number of literary responses to the event, many resonating with longer traditions in Japanese public culture that grapple with natural and nuclear catastrophe on the island (e.g. Luke and Karashima, 2012; Ozeki, 2013; and see Starrs, 2014). Future filmic representations of the *Tōhoku* wave will bear watching.

10. *The Life of Pi* is noted for its ocean effects. In a significant sequence, the main character, Pi, is at sea in a boat tossed by waves (Aquatic Development Group, n.d.). The waves were created in a '250-foot-long, 100-foot-wide and 9-foot-deep tank … able to hold up to 1.7 million gallons of water'. Director Ang Lee thought of the water this way: 'water had to become a character itself … I wanted something that could create an elongated wave, and show one side of it and having it dissolve from the other, so I could at least control the shape, size, pattern and rhythm' (Murphy, 2013).

    Mention of *The Perfect Storm* (2000) seems necessary here. In this movie, a fishing boat confronts a large wave that eventually upends it (see Morgan, 2018).

11. Compare *Dam 999*, a UAE–Indian co-production directed by Sohan Roy in 2011 about the bursting of an outdated dam, a film implicitly meant to call attention to state responsibilities to maintain dams.

12. Waves might have something in common with the outrageously large crowds that appear in many fantasy films these days, from *Lord of the Rings* to *Star Wars*. Such films 'use the digital multitude to spatialize time and to emblematize their protagonists' relationships to sudden, often apocalyptic historical change' (Whissel, 2014: 60).

13. *The Day After Tomorrow*, Keane argues, 'works in simultaneously reflecting and distancing itself from the events and psychological after-effects of 9/11'. *Reflecting* because the disaster hits New York. *Distancing* because the director studiously avoids staging collapsing buildings in ways that would evoke the Twin Towers and also because New York, ultimately, survives – and the cause of the disaster comes not from the legible zone of the political, but from a 'nature' whose political economic transformation assigns blame to a 'way of life', rather than to evil persons.

14. The infrastructural negligence permitting the storm surges and flooding of New Orleans in the wake of Hurricane Katrina in 2005 has been primarily treated in documentary – think of Spike Lee's *When the Levees Broke*, though *Beasts of the Southern Wild*, a 2012 magical realist story about a flood in a Louisiana bayou town, is clearly inspired by the event, even as its mythical cast risks depoliticizing the structures that leave some people and not others vulnerable to storm surge. But look to Cauleen Smith's Afrofuturist science fiction film, *The Fullness of Time* (2008), for a science fiction story that maps the strange and alienated experience of a Hurricane Katrina survivor as she walks the damaged city.

15. In *Point Break* (1991), for example, a crime thriller in which a team of surfers moonlights as a gang of bank robbers, a climactic scene involves one of the robbers, facing prison, released by his captor to surf one final wave, a wave that the policeman knows will kill him. As screenwriter Dmitry Portnoy (personal communication, 12 September 2017) observes, 'the breaking point is a nexus of transgressions: robbing banks, an FBI agent getting too close to the criminal he is investigating, the sublimated gay romance'. The crashing wave resolves all of these.

16. In *Surf's Up*, a cartoon about surfing penguins, animators hoped to render waves in the film using the tools of computer simulation, but, finding such virtual waves not packing enough emotion, worried that these wouldn't look 'real'. Eventually, the animators produced a virtual wave 'puppet', so that waves could be, as they put it, 'characters'. In the movie, they go from being frightening adversaries to being partners in surfing (go '*with* the wave').

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